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TECHNICAL REPORT BRL-TR-3205

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RHEOLOGY STUDIES ON M3C PROPELLANT

FREDERICK W. ROBBINS
PAUL J. CONROY

FEBRUARY 1991

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ERRATA

BRL-TR-3205 dated February 1991, Rheology Studies of M30 Propellant

Page 21, line 16 - change to read:

for (-65° F), 70 for (70° F), and 145 for (145° F). The M30 stands for M30A1 propellant, which in

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1. INTRODUCTION

In the last decade, one- and two-dimensional, two-phase-flow, unsteady, heterogeneous, reacting, gun interior ballistic computer codes, which provide digital simulations of flamespreading and a history of ignition transients, have been (or are being) developed. Examples of these codes are the one- and two-dimensional NOVA codes (Gough 1983; Gough 1980). The NOVA codes require as one of their inputs the rate of propagation of intergranular stress in the aggregate at the settling porosity (i.e., the speed of sound in the settled aggregate).

Gough (1980) has developed the basic relationship

$$\frac{D\sigma}{Dt_p} = -\rho_p a^2 \frac{D\epsilon}{Dt_p}, \quad (1)$$

where the operator D/Dt_p is the convective derivative along the solid phase streamline (i.e., assumes the observer is sitting on the moving solid). In Equation 1, a is the rate of propagation of intergranular stress, σ is the non-intrinsic average granular stress (positive in compression), i.e., $\sigma = (1 - \epsilon)R$ where R is the intrinsic intergranular stress, ϵ is the porosity of the aggregate (fraction of a unit volume occupied by gas), and ρ_p is the density of the propellant. Gough assumes a form

$$a(\epsilon) = a_1 \frac{\epsilon_o}{\epsilon}, \quad (2)$$

where a_1 is the intergranular stress at the settling porosity of the aggregate and ϵ_o is the settling porosity. Integrating Equation 1 using Equation 2 gives

$$\sigma = \rho_p a_1^2 \epsilon_o^2 \left(\frac{1}{\epsilon} - \frac{1}{\epsilon_o} \right). \quad (3)$$

2. EXPERIMENTAL

The Naval Ordnance Station (NOS), Indian Head, MD, performed a series of experiments (Birkett 1981) for the Ballistic Research Laboratory (BRL) using an existing piece of equipment to deduce stress vs. porosity on M30Al propellant. The apparatus, which is shown in Figure 1, was modified to measure not only the force on the top of the propellant bed but also the force on the bottom of the bed. A surge tank was added to allow the force-time curve to be tailored to rise to a given upper force level as fast as

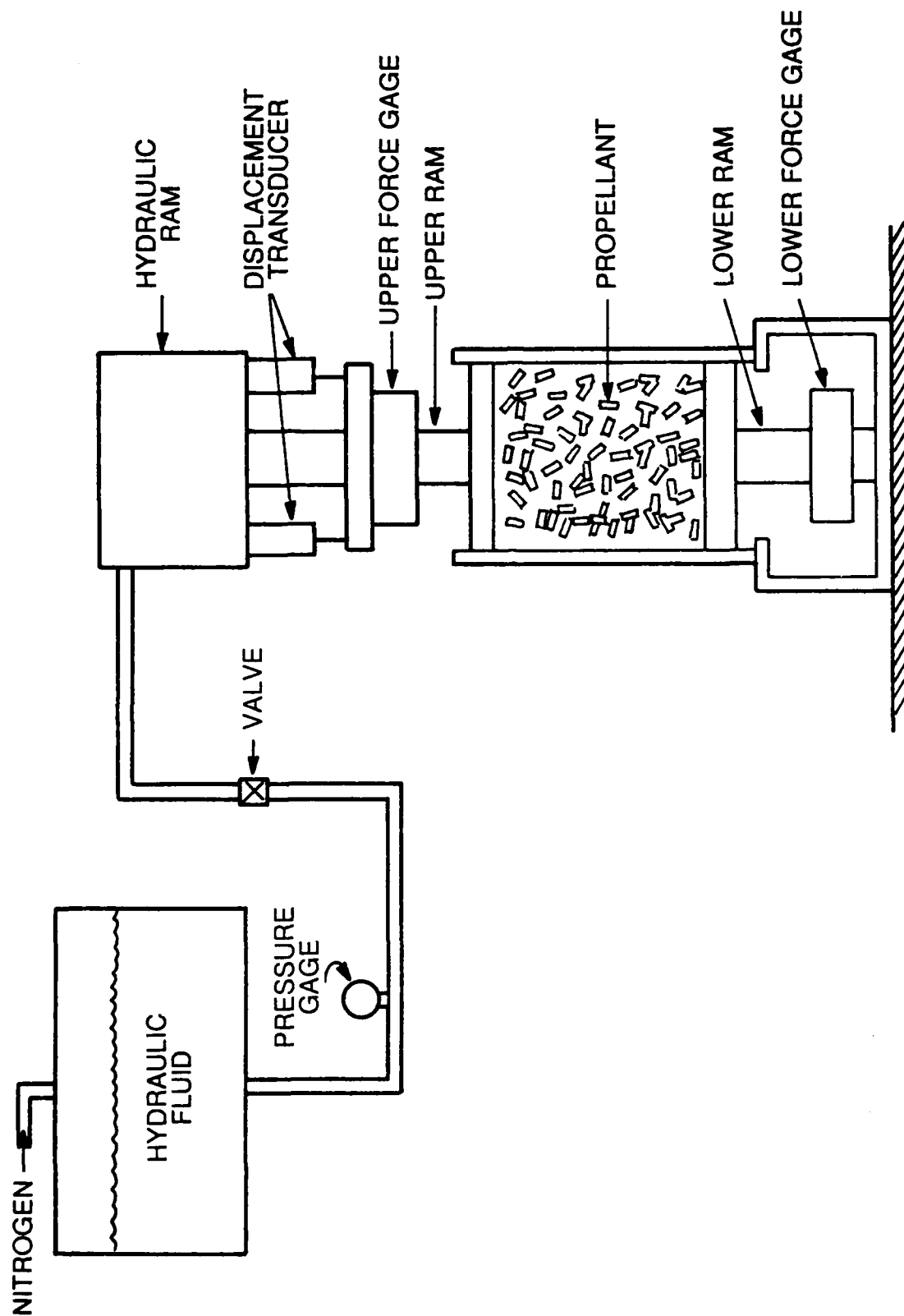


Figure 1. Rheology Apparatus.

possible (on the order of one second) and remain at that level for many seconds. A sample of force-time curves is given in Figure 2.

The propellant was subjected to the same force-time function for three different propellant temperatures (nominally, 219 K, 294 K, and 336 K) and for four different final upper force levels (nominally, 16,200 N, 31,100 N, 48,900 N, and 62,300 N). Usually two or three repetitions were performed at each pressure level and temperature.

The rheology fixture consists of a large tank filled with hydraulic fluid which is pressurized with nitrogen gas to a specified value, at which time a valve between the hydraulic ram and the tank is opened. The ram then compressed a measured amount of propellant contained in a steel cylinder (7.768 cm in diameter and 27.86 cm high). Force gages (BLH Electronics model C3P2-C) were used to measure the force both on the top of and at the bottom of the propellant bed. The motion of the top ram was monitored with two linear variable differential transformers (Model FSCM 62767 by SCR Division of Moxon Inc.). A pressure cell (BLH Electronics Model DHF) was used to monitor the hydraulic fluid pressure.

The experiments were controlled by a PDP-11/10 minicomputer. A 15-bit Phoenix A/D converter was used to digitize the data which were stored on magnetic disks.

The procedure included the preweighing of the sample of M30Al propellant (Lot RAD-79E-069960), which gave a convenient bed depth of approximately 20.3 cm (approximately 0.9 kg). The propellant samples were preconditioned to 211 K for the 219 K tests and 344 K for the 336 K tests. Portions of the steel fixture in contact with the propellant were also temperature conditioned. The cylinder was wrapped with insulation for the extreme temperature runs. In the tests, propellant was poured into the fixture, the side of the cylinder was tapped with a mallet to settle the propellant, and the upper ram was lowered to the top of the propellant bed. The initial distance from the top of the cylinder to the top of the upper arm was measured manually. The random arrangement of grains at the surface made it difficult to standardize this measurement (and therefore the initial porosity). The nitrogen pressure was raised in the hydraulic fluid tank to a prescribed pressure, at which time the computer opened the connecting valve to the hydraulic ram and started to collect data. The nitrogen gas was vented, and the upper ram was raised remotely after the data were collected.

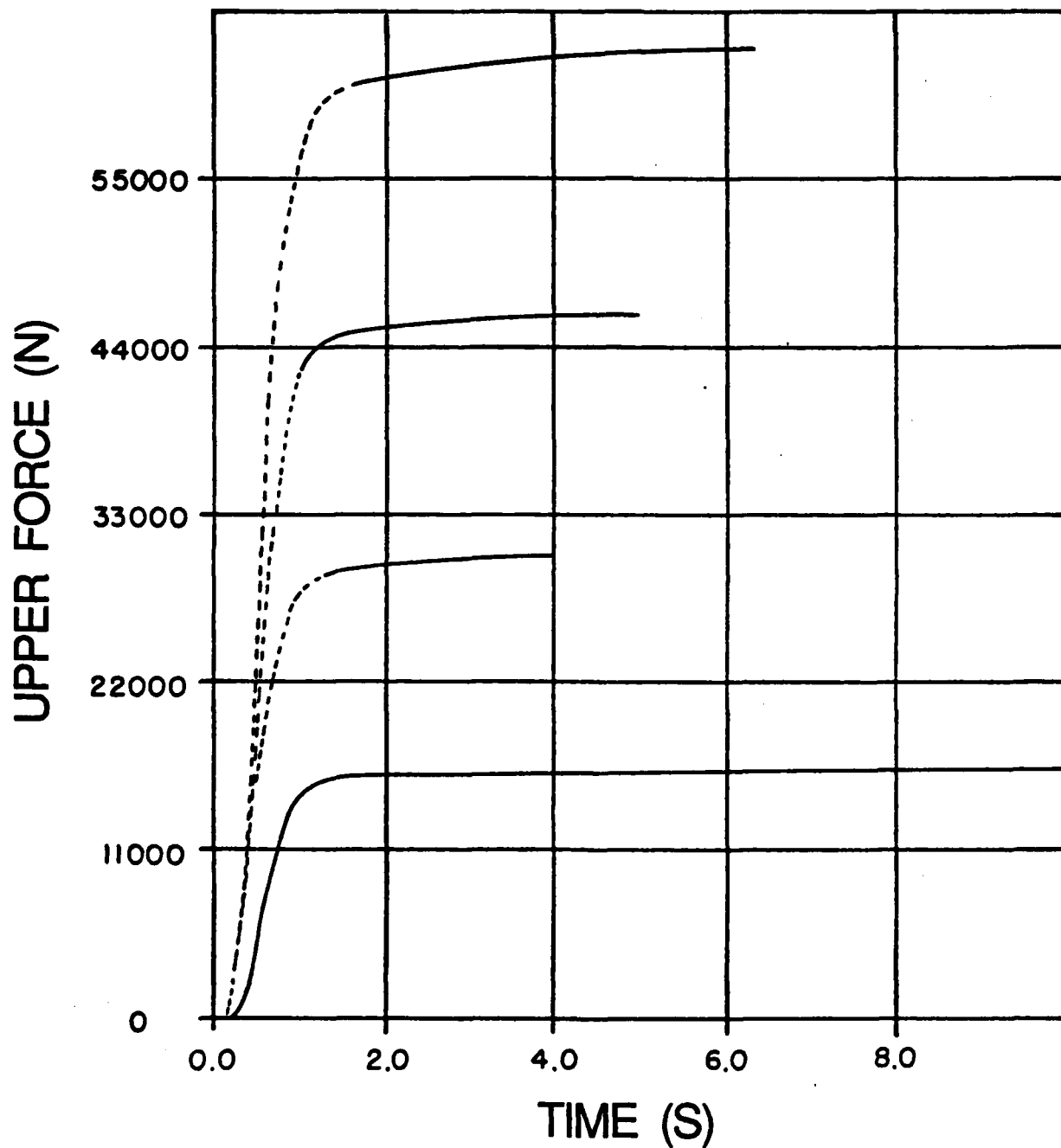


Figure 2. Typical Upper Force-Time Curves at 294 K for Different Final Force Levels.

The data consisted of two independent displacement measurements of the top ram, four force measurements (two independent measurements at the top and bottom of the propellant bed), and the hydraulic fluid pressure, all as functions of time. These data are provided in the Appendix.

3. DATA REDUCTION

The data were reduced with a computer program provided by NOS, Indian Head, MD. Calculated values were the averaged displacement, the averaged upper and lower forces, and the porosity with tabulated values of time and hydraulic oil pressure. The inertial forces were calculated to be less than one percent of the applied forces and were neglected. The computer program was modified to calculate the rate of propagation of intergranular stress, a , from Equation 1 by least-squares fitting the stress vs. porosity to a form

$$\sigma = c + d\epsilon \quad (4)$$

over a given number of points; therefore, using (1) and (4),

$$a = \sqrt{\frac{d\epsilon}{-\rho_p}} \quad (5)$$

The calculated values of stress propagation for different temperatures over the first ten points (0.04s), for which the force is greater than 1,000 N, are tabulated in Table 1 for both the stress calculated at the top and bottom of the bed. These values of a , the rate of propagation of intergranular stress at the settling porosity, are the required input values to both the one-dimensional and two-dimensional NOVA codes.

4. OTHER OBSERVATIONS

As well as getting speed of sound data at the settling porosity for different temperatures of M30A1 propellant, it was hoped to obtain a rate dependant behavior at different temperatures. By assuming a relationship of rate vs. temperature, extrapolation to higher rates than experimentally determined may be expected. Unfortunately, the only experiments that showed any rate dependance (Figure 3) were for 336 K. The 294 K and 219 K experiments did not exhibit any detectable rate dependance (Figures 4 and 5). The stress rates ranged from 2.5 MPa/s to 25 MPa/s. This is three orders of magnitude less than would be calculated for a typical top-zone 155-mm howitzer firing. It should be noted that the initial porosity was arbitrarily normalized to 0.45, by calculating the initial distance to the top of the bed required to give this value, to simplify comparisons of Figures 3, 4, and 5.

Table 1. Rate of Propagation of Intergranular Stress a_1 at The Settling Porosity with Different Force Levels and Temperatures

Temperature	219 K		294 K		336 K	
Final Top Force, N	a_1 Top, m/s	a_1 Bottom, m/s	a_1 Top, m/s	a_1 Bottom, m/s	a_1 Top, m/s	a_1 Bottom, m/s
16,200	253	216	166	138	85	65
	282	248	179	152	93	61
	247	211	185	119		
20,800			190	167		
			178	158		
			182	158		
26,700			176	155		
31,100	239	208	187	160	101	67
	254	220	195	161		
			182	163		
			184	164		
			189	159		
48,900	251	208	186	161	105	77
	256	213	190	159	115	88
62,300	242	199	193	166	107	80
	224	188	190	167	120	95
	229	192	195	173	123	94
Average S.D.	248 (16.1)	210 (16.8)	185 (7.5)	157 (12.6)	106 (13.1)	78 (13.2)

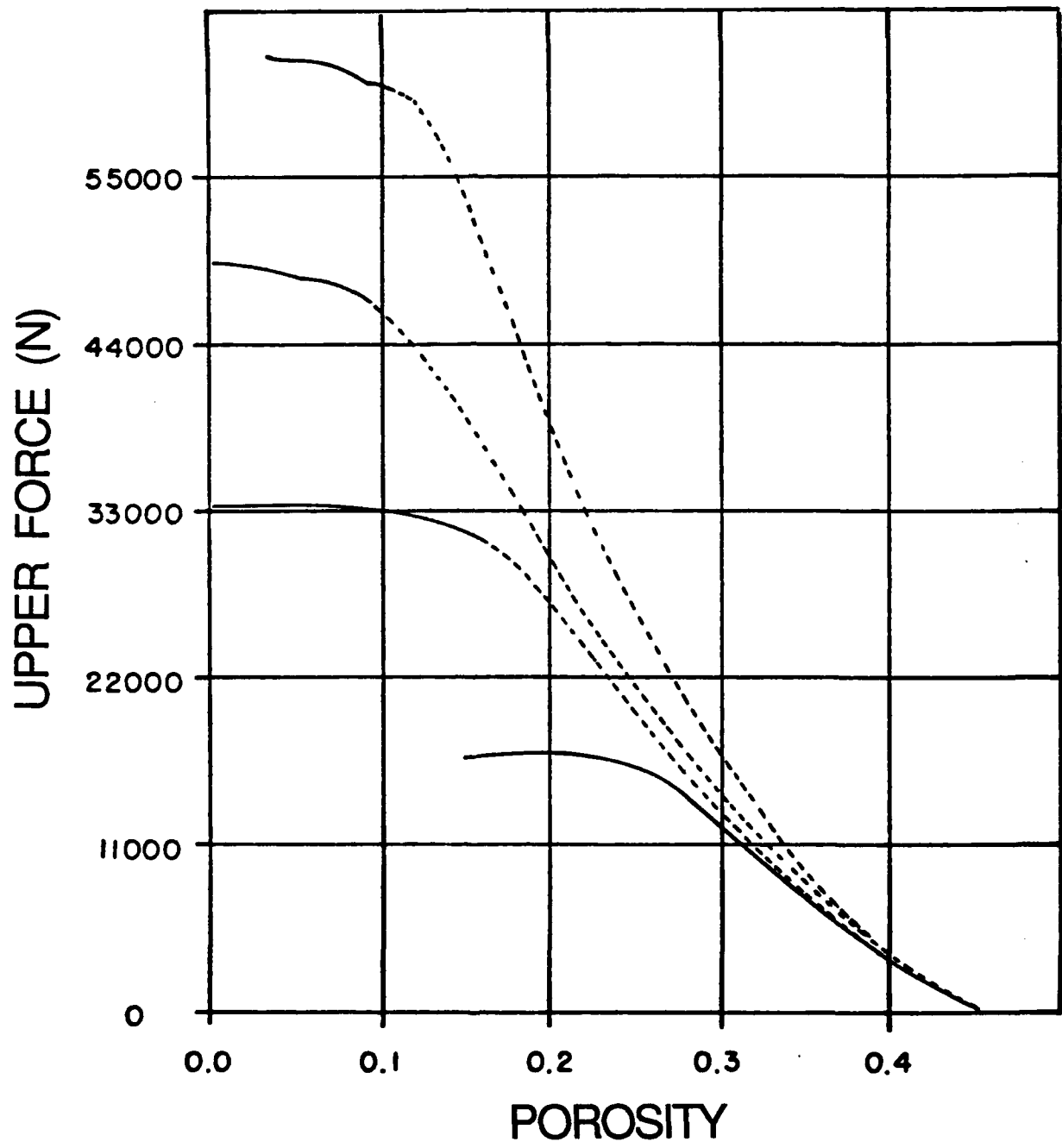


Figure 3. Upper Force-Porosity Curves at 336 K for Different Final Force Levels.

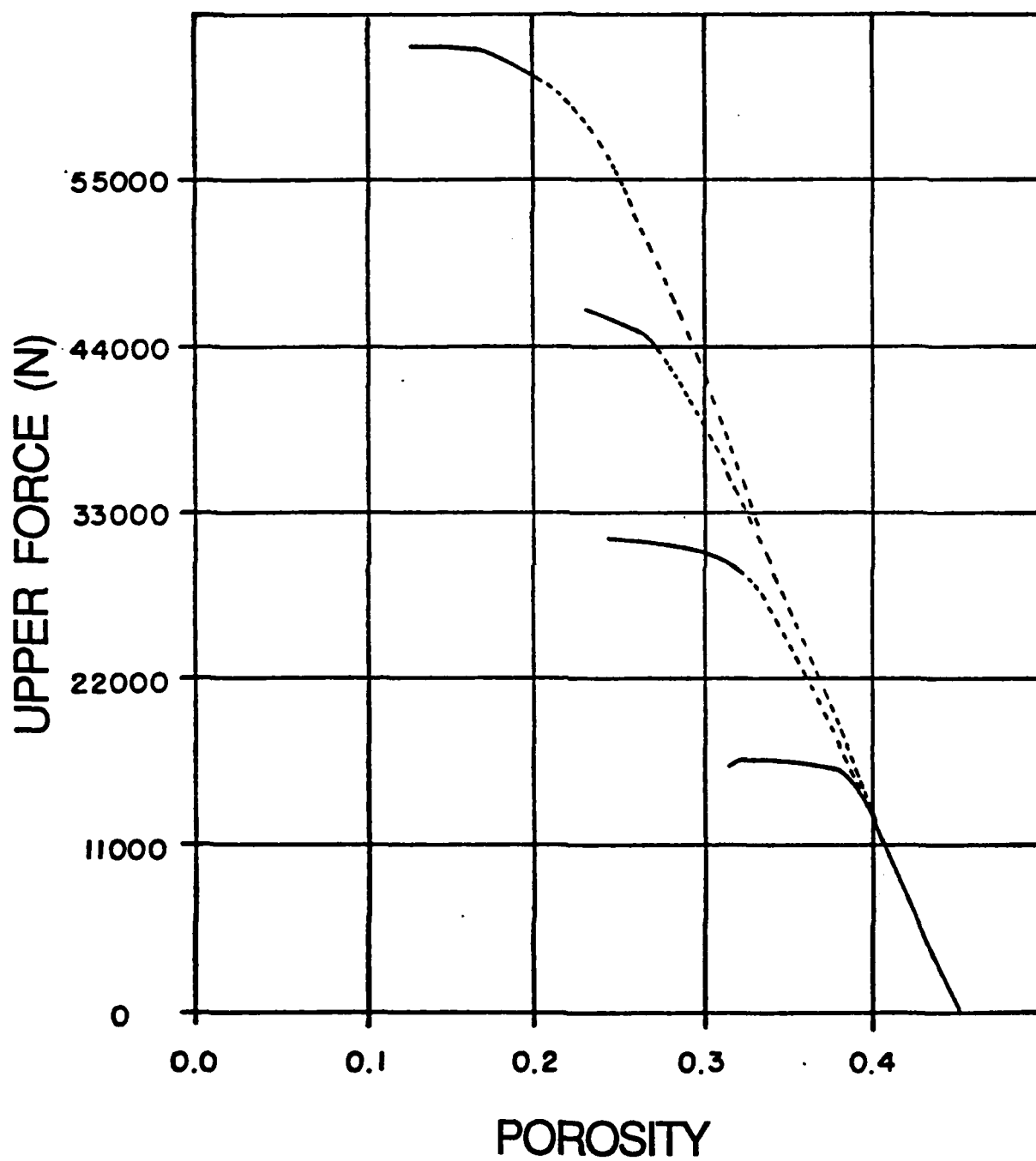


Figure 4. Upper Force-Porosity Curves at 294 K for Different Final Force Levels.

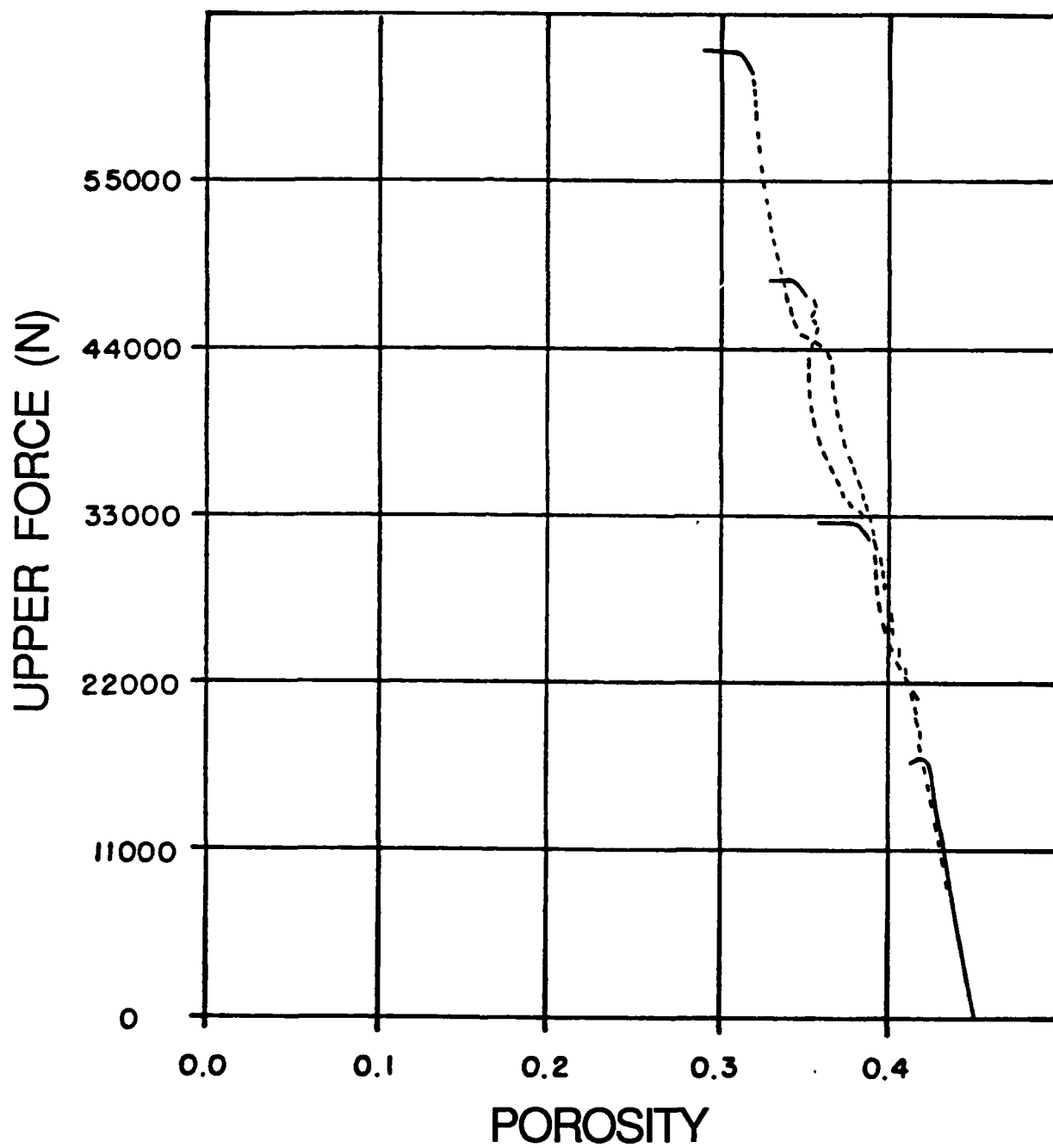


Figure 5. Upper Force-Porosity Curves at 219 K for Different Final Force Levels.

If we assume a linear model of a viscoelastic material (Flugge 1967) (see Figure 6), the differential equation describing this model is

$$\sigma + p_1 \dot{\sigma} = q_0 E + q_1 \dot{E} , \quad (6)$$

where p_1 , q_0 , and q_1 are constants describing the physical characteristics of the system and E is the strain; then for the portion of the strain-time curve for a constant stress level, σ_0 is

$$E = \frac{\sigma_0}{q_0} + \left(E(0) - \frac{\sigma_0}{q_0} \right) e^{-\frac{q_1}{q_0} t} . \quad (7)$$

When the points on a stress-time curve are fit to the form $E = a + be^{ct}$ over the constant stress portion of the strain-time curve, and compared to the analytical result, there is virtually no detectable difference (Figure 7). The resulting equation is

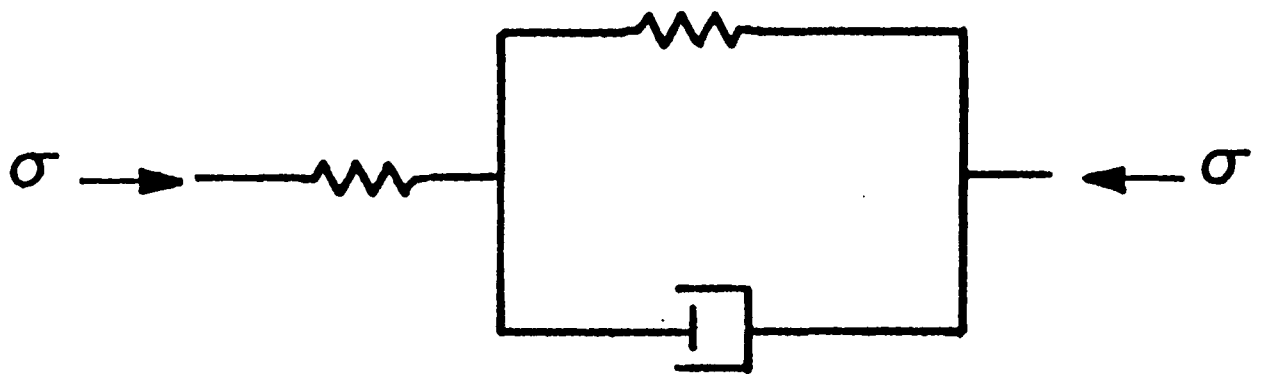
$$E = 0.33545 - 0.06575e^{-0.48363t} \quad (8)$$

for this fit. If the fit is attempted over the entire time span, deviations appear (Figure 8), indicating a need for a more complex model in the less highly compacted region.

The experiments were performed with force measurements being made at both the top and bottom of the propellant bed; therefore, the resistive force F_r will be the difference between the F_t measured at the top of the propellant bed and the force F_b measured at the bottom of the propellant bed (Kuo, Moore, and Yang 1979).

$$F_r = F_t - F_b . \quad (9)$$

A plot of force measured at the top of the propellant bed vs. the resistive force (Figure 9) for the top force level of 62,300 N at three different temperatures shows that, for 294 K, the resistive force, after the value of the top force becomes constant, continues to increase with time. This would be expected if during the dynamic portion of the rise to the steady force level, a sliding coefficient of friction is assumed and then a higher static coefficient of friction is assumed during the constant force portion of the compression of the propellant where little propellant motion takes place. Both the hot and cold experiments show an unexpected decrease in the resistive force in the constant force region. This unexplained effect was noted at all force levels and possibly could be due to grains shifting in the bed.



$$\sigma + p_1 \dot{\sigma} = q_0 E + q_1 \dot{E}$$

Figure 6. A Linear Viscoelastic Model.

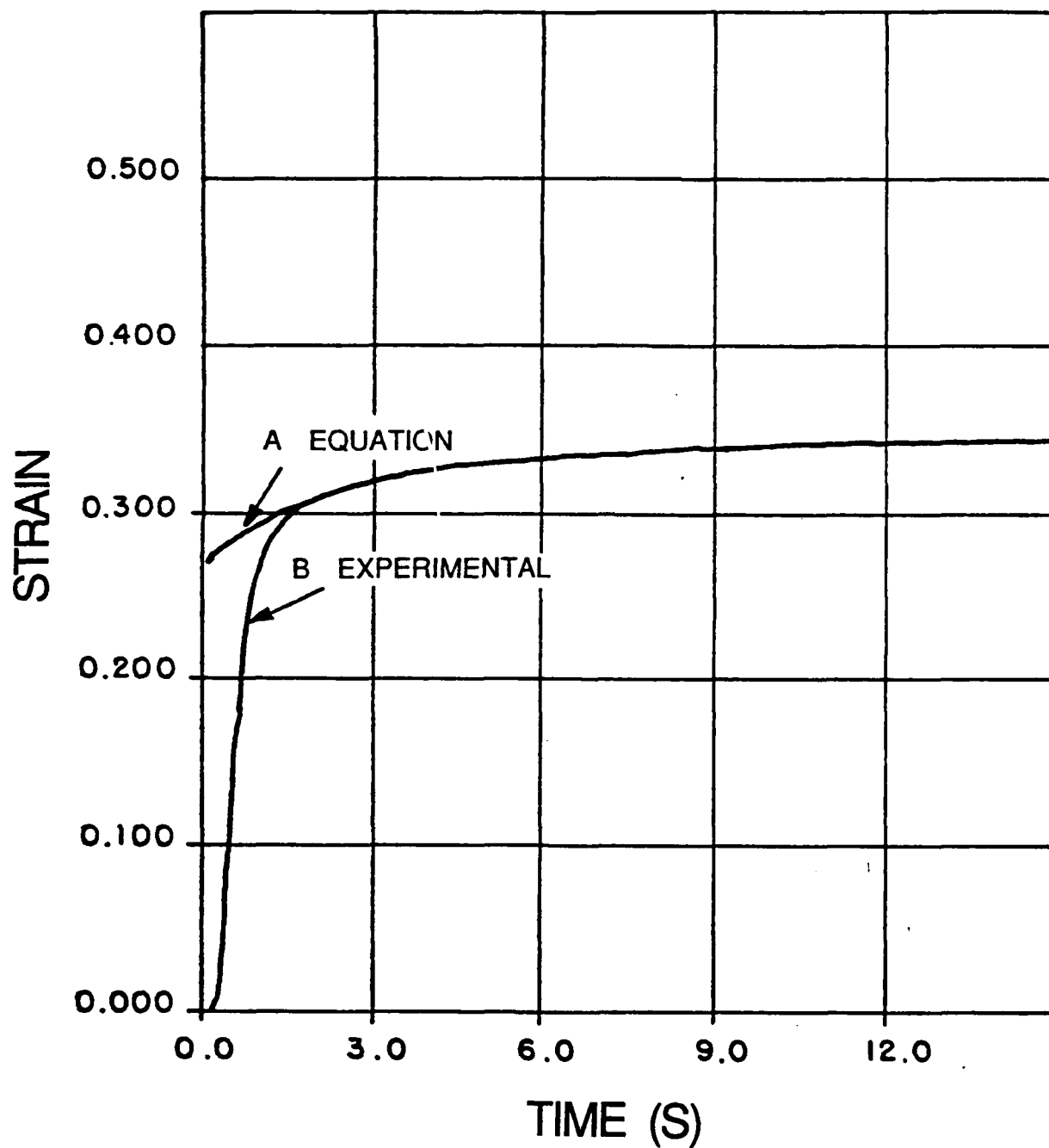


Figure 7. Comparison of Experimental Strain-Time Plot With the Linear Model $1.5 < t < 5.5$.

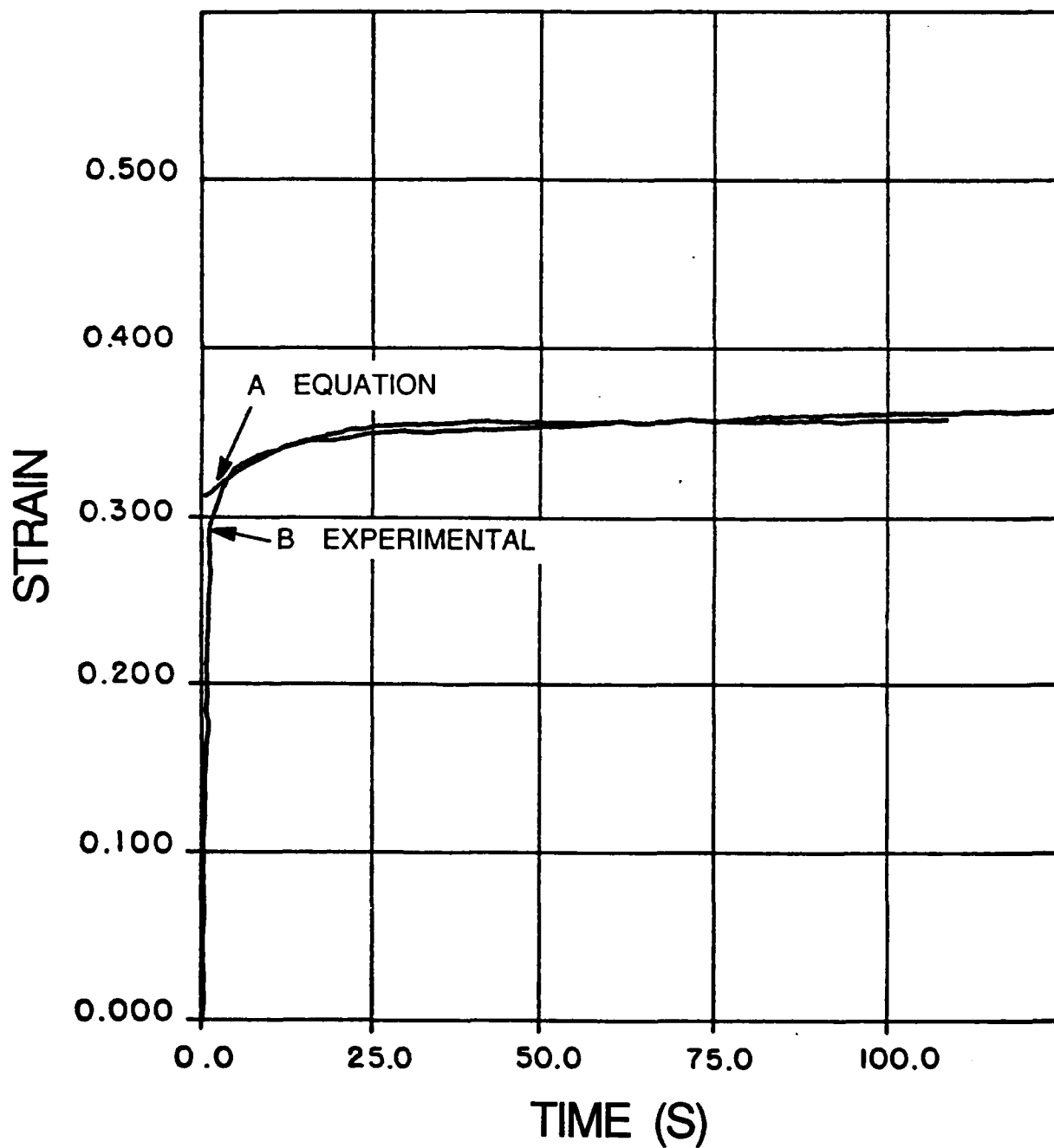


Figure 8. Comparison of Experimental Strain-Time Plot With the Linear Model $1.5 < t < 125$.

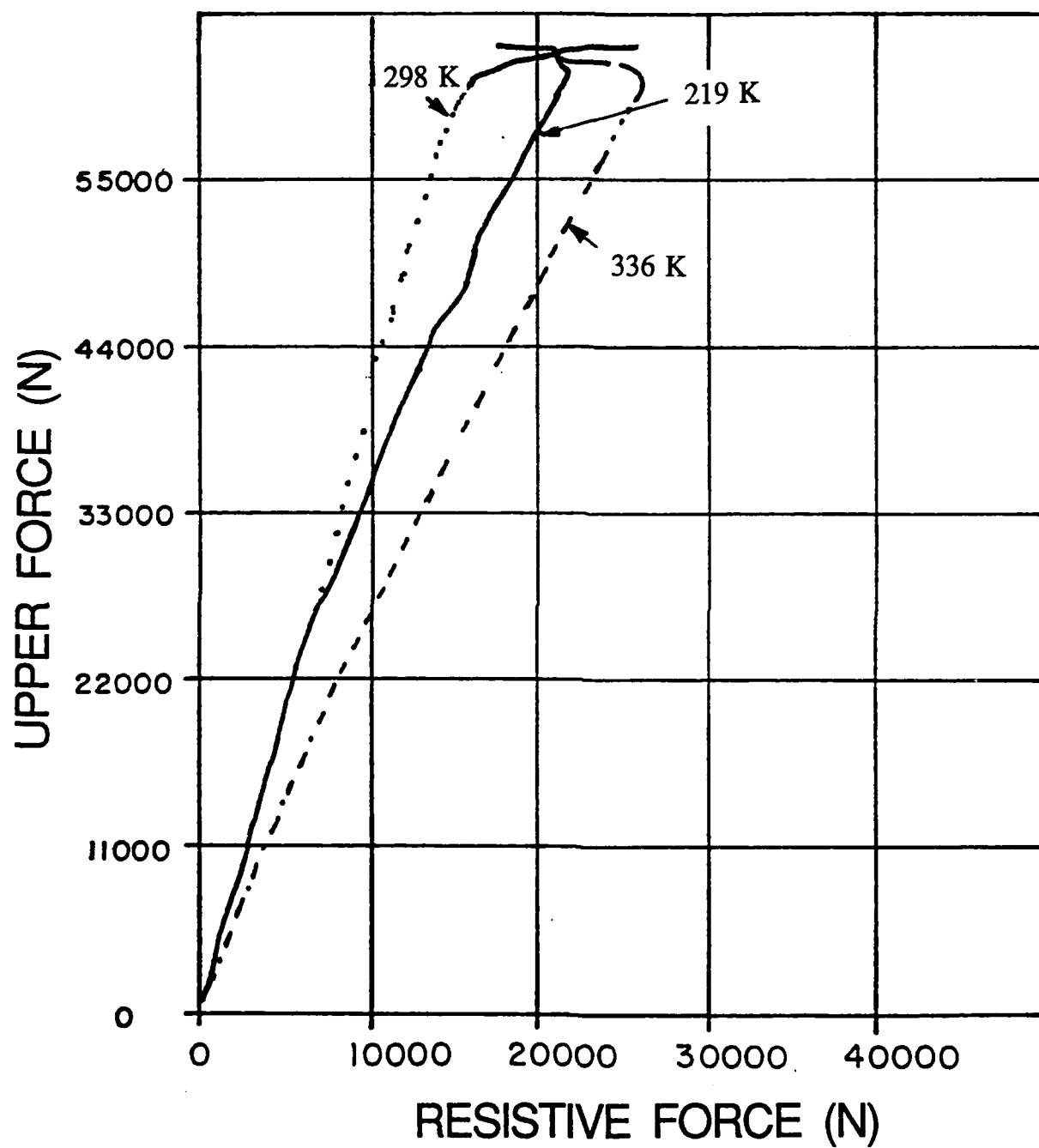


Figure 9. Upper Force-Resistive Force Plot at Different Temperatures (219 K, 294 K, and 336 K).

5. NOVA CALCULATIONS

Calculations were performed using both the one- and two-dimensional NOVA codes for a M203 propelling charge in a 155-mm, M198 howitzer. The only variable changed was the value of a_1 . The values of a_1 used were 210, 157, and 78 m/s for cold, ambient, and hot propellant, respectively. For the two-dimensional calculations, there was a 2% change in the maximum pressure calculated, a 1.2% change in the velocity going from hot to cold, and a 10% difference in the calculated pressure difference curves. For the one-dimensional calculations, there was virtually no change in the calculated maximum pressure and pressure difference curves and a 0.2% change in the velocity going from hot to cold. This is reassuring since it implies that previous calculations using values of a_1 from rheology experiments at ambient temperature (Horst and Robbins 1977) are acceptable for the calculation of maximum pressure and velocity. This does not, however, mean that rheology data are unimportant, as this same range of values for a_1 can lead to substantial differences in the prediction of pressure waves. Further, when an analysis of possible grain fracture is included, significant differences in maximum chamber pressure and velocity are possible as well.

The one-dimensional NOVA code also calculates a projectile stress level when the propellant hits its base. The calculated levels are different (10.1 MPa for the cold, 8.9 MPa for the hot propellant). This decrease of 20% suggests that if shock loading of the projectile is important, consideration must be given to the a_1 input value.

As stated before, Gough assumes a relationship

$$a(\epsilon) = a_1 \epsilon_o / \epsilon, \quad (10)$$

for the speed of the intergranular stress as a function of the propellant porosity. The cold and ambient experiments have nearly a linear region of stress vs. porosity, which would lead to

$$a(\epsilon) = a_1 (\epsilon_o - \epsilon), \quad (11)$$

or

$$\sigma = -\rho_p a_1^2 \frac{(\epsilon_o - \epsilon)^3}{3} \quad (12)$$

The hot tests show an increase in α , in which case Gough's relationship (Equation 10) is applicable.

The resistive forces between the propellant and the walls of the metal cylinder used in the experiments are in the order of 20-50% of the applied force. If it is assumed that, as is done in the NOVA code, there is negligible frictional force between the propellant and the gun wall, then the values of α_1 used as input to the NOVA code should be those values of α_1 calculated from the lower force measurements as tabulated in Table 1. If there is significant contact between the wall and the propellant, then consideration should be given to modeling this effect or developing some correlation to account for it.

6. CONCLUSIONS

(1) A series of experiments has been performed which provides data for M30A1 propellant, for calculation of α , the rate of propagation of intergranular stress, at the settling porosity, and at more highly compacted levels. The experiments were performed at 219 K, 294 K, and 336 K.

(2) No discernable rate effects were seen for the 219 K and 294 K experiments. The rate of propagation of intergranular stress α was constant over a wide range of porosities. The 336 K experiments indicated both rate effects and an increase in the rate of propagation of intergranular stress as the porosity decreased.

(3) An unexplained decrease in the resistive force between the propellant and the container for 219 K and 336 K at constant force levels was noted.

(4) NOVA code calculations indicate a very small dependence on the input parameter α_1 for the major ballistic parameters but did indicate a dependence on shock loading of the projectile.

7. REFERENCES

- Birkett, J. A. "The Acquisition Of M30A1 Propellant Rheology Data." IHTR 724, Naval Ordnance Station, Indian Head, MD, September 1981.
- Flugge, W. Viscoelasticity. Waltham, MA: Blaisdell Publishing Company, pp. 13-19, 1967.
- Gough, P. S. "The NOVA Code: A Users Manual." IHTR 80-8, Naval Ordnance Station, Indian Head, MD, December 1980.
- Gough, P. S. "Two-Dimensional, Two-Phase Modeling of Multi-Increment Bagged Artillery Charges." BRL-CR-00503, U.S. Army Ballistic Research Laboratory, Aberdeen Proving Ground, MD, February 1983.
- Horst, A. W., and F. W. Robbins. "Solid Propellant Gun Interior Ballistic Annual Report: FY-76/TQ," IHTR 456, Naval Ordnance Station, Indian Head, MD, January 1977.
- Kuo, K., B. Moore, and V. Yang. "Measurement and Correlation of Intergranular Stress and Particle Wall Friction in Granular Propellant Beds." Proceedings of the 16th JANNAF Combustion Meeting, CPIA Publication 308, vol. I, pp. 559-581, December 1979.

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**APPENDIX:
RHEOLOGICAL EXPERIMENT DATA**

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This appendix contains the data collected in 36 rheological experiments performed at the Naval Ordnance Station (NOS), Indian Head, MD (Birkett 1981). The setup is illustrated in Figure 1. There are two independent measurements of the distance the top ram moves as well as independent measurements of the force at the top and bottom of the propellant bed. These values are averaged, with the averaged value given in the following tables. The pressure in the hydraulic oil line is also measured and tabulated. The total number of data points per channel is 500, with a higher sampling rate for the first 250 points than the last 250 points. The first 30 points are tabulated and then every tenth point after that. There are also values of porosity, strain, and resistive forces calculated and tabulated for each point. The porosity is defined to be the ratio of the instantaneous volume of the gas to the total volume at that time; the strain is defined as the ratio of the instantaneous change in height to the height at that time; and the resistive force is defined to be the difference between the top force and the bottom force measurement at that time. The density used to calculate the porosity was measured at NOS as 1.67 g/cc. The experiments were performed at three different temperatures which are coded in the filename. The filenames have the form M30xxx.yyy, where xxx defines the temperature of the experiment and yyy is the run number (002-037). The temperatures were chosen to be 219 K, 294 K, and 336 K, and the values of yyy are 65 (for -650° F), 70 for (700° F), and 145 for (1,450° F). The M30 stands for M30A1 propellant, which in this case was from lot RAD-79E- 069960. The first seven runs were run with a constant sampling rate for all 500 points (002-007 having a sampling rate of 0.01 seconds/point and having a sampling rate of 0.2 seconds/point for 008). The sampling rate is printed out on the tables for the other tests.

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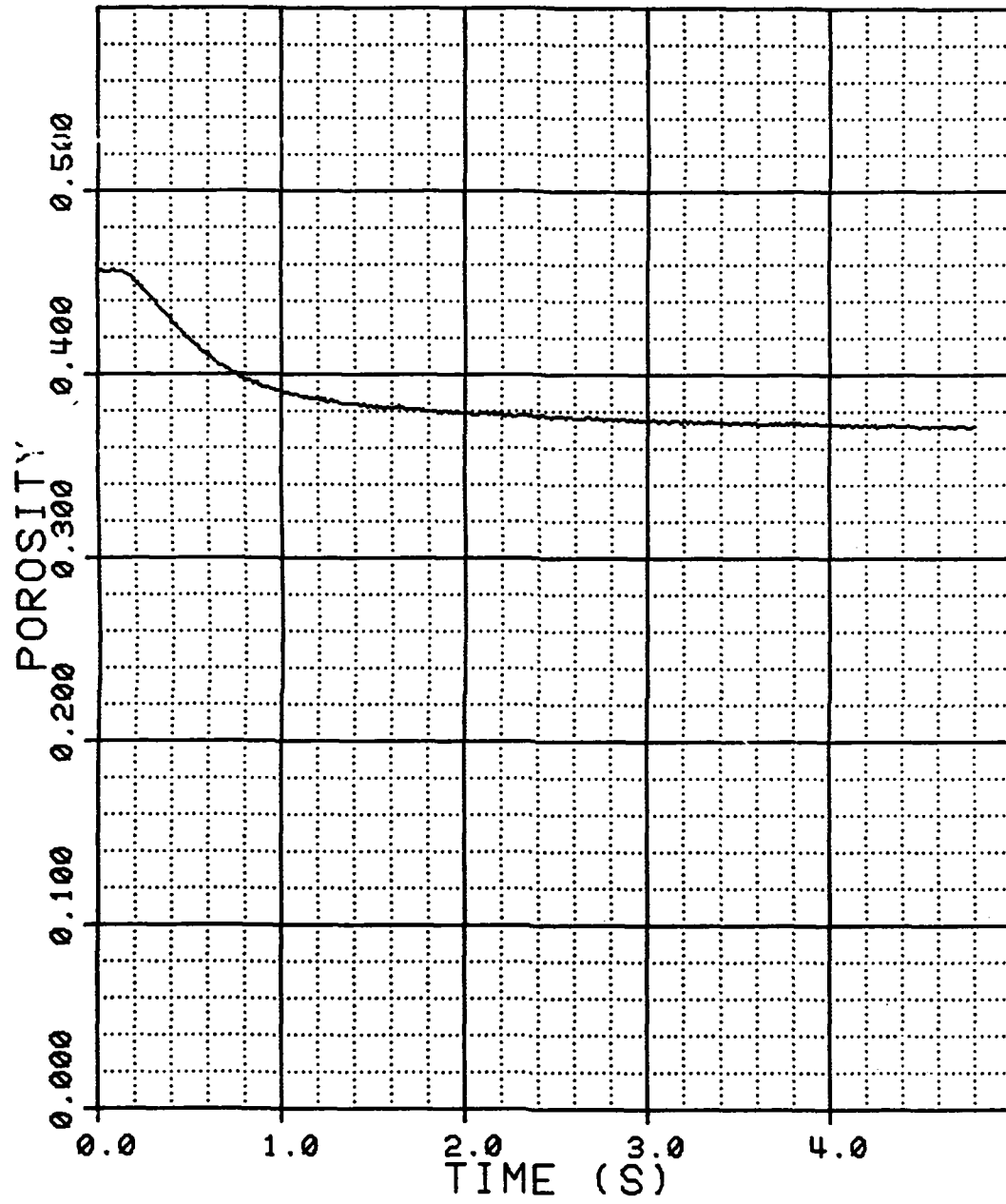
INITIAL HEIGHT OF BED 202.6 MM
MASS OF PROPELLANT 0.8744 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
0.00	0.4562	107.	93.	15.	0.0	2.05	0.0000
0.01	0.4563	127.	109.	17.	-0.0	2.06	-0.0002
0.02	0.4567	137.	127.	10.	-0.2	2.05	-0.0009
0.03	0.4564	140.	130.	10.	-0.1	2.05	-0.0003
0.04	0.4564	115.	111.	4.	-0.1	2.05	-0.0004
0.05	0.4561	112.	107.	4.	0.0	2.05	0.0001
0.06	0.4562	128.	121.	7.	-0.0	2.05	-0.0001
0.07	0.4559	104.	83.	21.	0.1	2.05	0.0005
0.08	0.4565	143.	127.	16.	-0.1	2.05	-0.0007
0.09	0.4565	134.	128.	7.	-0.1	1.98	-0.0006
0.10	0.4561	112.	107.	4.	0.0	1.64	0.0002
0.11	0.4564	140.	127.	13.	-0.1	1.23	-0.0003
0.12	0.4561	146.	119.	27.	0.0	1.09	0.0002
0.13	0.4564	184.	134.	50.	-0.1	1.13	-0.0005
0.14	0.4564	287.	188.	98.	-0.1	1.23	-0.0005
0.15	0.4552	422.	255.	167.	0.4	1.32	0.0018
0.16	0.4548	581.	361.	220.	0.5	1.39	0.0024
0.17	0.4540	760.	474.	286.	0.8	1.44	0.0040
0.18	0.4539	1027.	658.	368.	0.8	1.47	0.0041
0.19	0.4527	1256.	831.	424.	1.3	1.48	0.0064
0.20	0.4511	1454.	960.	494.	1.9	1.49	0.0093
0.21	0.4500	1681.	1125.	555.	2.3	1.49	0.0113
0.22	0.4496	1906.	1293.	613.	2.4	1.49	0.0120
0.23	0.4482	2107.	1415.	692.	2.9	1.49	0.0144
0.24	0.4478	2366.	1617.	749.	3.1	1.50	0.0151
0.25	0.4458	2572.	1738.	834.	3.8	1.51	0.0187
0.26	0.4450	2815.	1907.	908.	4.1	1.52	0.0202
0.27	0.4439	3063.	2078.	985.	4.5	1.53	0.0222
0.28	0.4433	3363.	2286.	1077.	4.7	1.54	0.0231
0.29	0.4417	3595.	2446.	1148.	5.2	1.54	0.0259
0.39	0.4310	6462.	4466.	1996.	9.0	1.63	0.0442
0.49	0.4195	8984.	6210.	2774.	12.8	1.72	0.0631
0.59	0.4105	11234.	7757.	3477.	15.7	1.79	0.0774
0.69	0.4043	12932.	8970.	3962.	17.6	1.86	0.0871
0.79	0.3987	14051.	9699.	4352.	19.4	1.91	0.0956
0.89	0.3938	14730.	10088.	4642.	20.9	1.94	0.1030
0.99	0.3907	15144.	10301.	4843.	21.8	1.96	0.1075
1.09	0.3891	15425.	10440.	4985.	22.3	1.98	0.1099
1.19	0.3865	15545.	10434.	5110.	23.0	1.99	0.1136

RHEOLOGY DATA FOR FILE
M3070.002

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
1.29	0.3854	15663.	10445.	5218.	23.3	2.00	0.1152
1.39	0.3041	15745.	10437.	5308.	23.7	2.01	0.1170
1.49	0.3826	15787.	10352.	5435.	24.2	2.01	0.1192
1.59	0.3816	15837.	10308.	5529.	24.4	2.01	0.1206
1.69	0.3805	15827.	10211.	5615.	24.7	2.02	0.1221
1.79	0.3801	15830.	10139.	5691.	24.9	2.02	0.1227
1.89	0.3798	15853.	10086.	5767.	24.9	2.02	0.1231
1.99	0.3787	15818.	9976.	5841.	25.3	2.02	0.1247
2.09	0.3788	15856.	9937.	5919.	25.2	2.02	0.1246
2.19	0.3786	15847.	9878.	5969.	25.3	2.02	0.1249
2.29	0.3777	15827.	9793.	6034.	25.6	2.02	0.1261
2.39	0.3769	15840.	9746.	6094.	25.8	2.03	0.1272
2.49	0.3773	15878.	9732.	6147.	25.7	2.03	0.1267
2.59	0.3759	15861.	9649.	6212.	26.1	2.03	0.1286
2.69	0.3760	15865.	9609.	6256.	26.0	2.03	0.1285
2.79	0.3761	15906.	9597.	6309.	26.0	2.03	0.1283
2.89	0.3752	15880.	9522.	6357.	26.3	2.04	0.1296
2.99	0.3751	15896.	9495.	6401.	26.3	2.03	0.1297
3.09	0.3754	15928.	9491.	6437.	26.2	2.04	0.1293
3.19	0.3742	15902.	9424.	6478.	26.5	2.04	0.1309
3.29	0.3740	15914.	9396.	6518.	26.6	2.03	0.1312
3.39	0.3744	15949.	9400.	6549.	26.5	2.04	0.1307
3.49	0.3741	15959.	9368.	6590.	26.6	2.04	0.1311
3.59	0.3741	15965.	9347.	6618.	26.6	2.03	0.1312
3.69	0.3730	15939.	9284.	6655.	26.9	2.03	0.1326
3.79	0.3737	15972.	9300.	6672.	26.7	2.04	0.1316
3.89	0.3728	15961.	9246.	6715.	26.9	2.03	0.1329
3.99	0.3734	15981.	9255.	6726.	26.8	2.04	0.1321
4.09	0.3730	15993.	9236.	6757.	26.9	2.04	0.1326
4.19	0.3730	15999.	9221.	6779.	26.9	2.03	0.1326
4.29	0.3718	15973.	9157.	6816.	27.2	2.04	0.1343
4.39	0.3717	15992.	9151.	6841.	27.2	2.04	0.1344
4.49	0.3713	15996.	9139.	6857.	27.3	2.03	0.1349
4.59	0.3718	15986.	9127.	6859.	27.2	2.04	0.1343
4.69	0.3711	15979.	9093.	6886.	27.4	2.04	0.1352
4.79	0.3719	16012.	9116.	6896.	27.2	2.04	0.1341

M3070.002



RHEOLOGY DATA FOR FILE
M3070.003

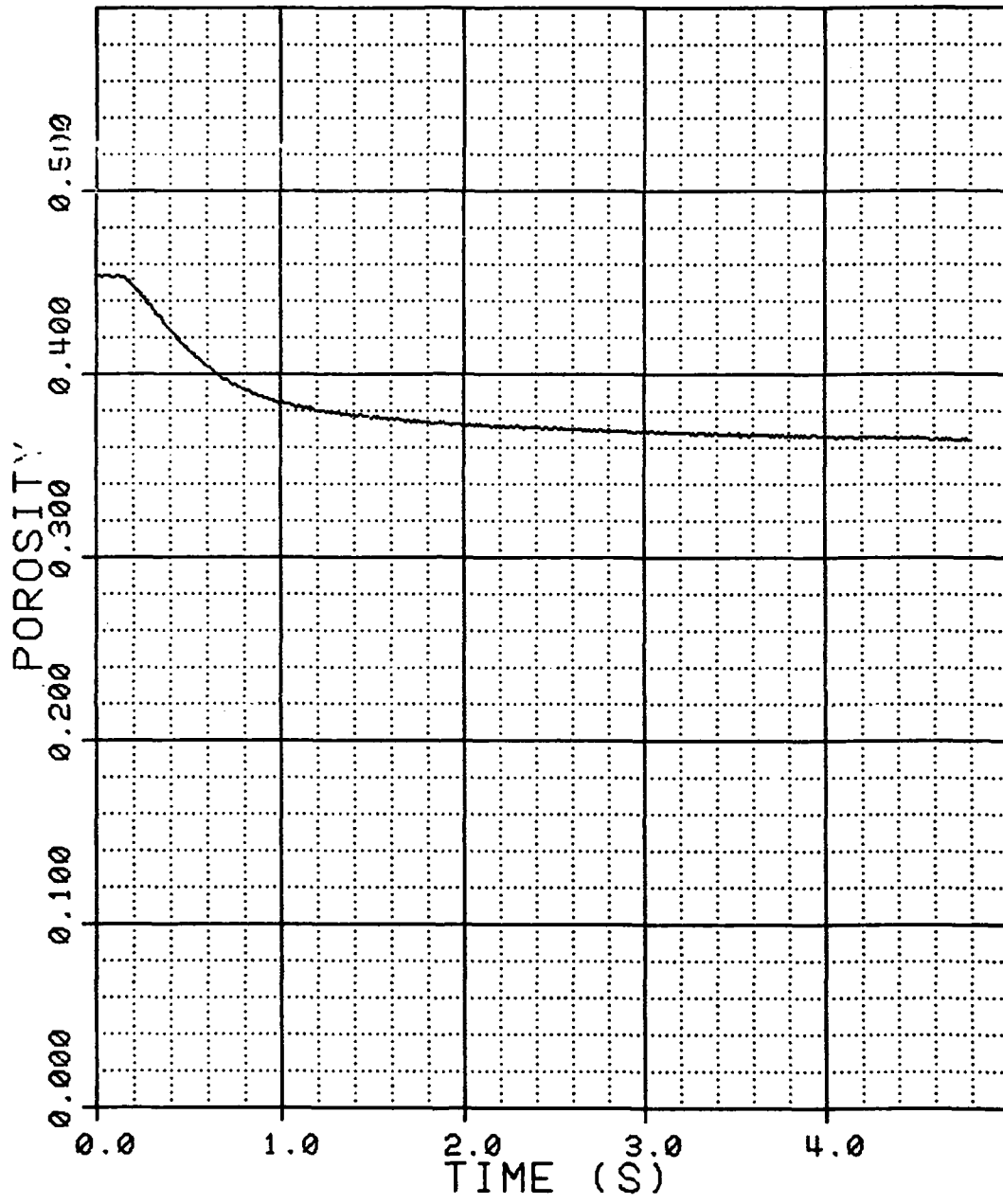
INITIAL HEIGHT OF BED 202.3 MM
MASS OF PROPELLANT 0.8769 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
0.00	0.4536	129.	127.	2.	0.0	2.08	0.0000
0.01	0.4540	164.	161.	3.	-0.1	2.08	-0.0006
0.02	0.4535	139.	137.	2.	0.0	2.08	0.0002
0.03	0.4534	132.	127.	5.	0.1	2.08	0.0005
0.04	0.4541	162.	162.	-0.	-0.2	2.08	-0.0008
0.05	0.4537	139.	138.	1.	-0.0	2.08	-0.0001
0.06	0.4541	165.	166.	-1.	-0.2	2.08	-0.0008
0.07	0.4540	146.	149.	-3.	-0.1	2.08	-0.0006
0.08	0.4533	132.	131.	1.	0.1	2.08	0.0007
0.09	0.4534	132.	124.	8.	0.1	1.96	0.0005
0.10	0.4534	135.	127.	8.	0.1	1.53	0.0004
0.11	0.4539	146.	142.	4.	-0.1	1.22	-0.0005
0.12	0.4535	176.	147.	29.	0.0	1.14	0.0002
0.13	0.4533	222.	143.	79.	0.1	1.19	0.0006
0.14	0.4530	344.	207.	137.	0.2	1.28	0.0012
0.15	0.4528	522.	338.	183.	0.3	1.37	0.0015
0.16	0.4519	677.	426.	250.	0.6	1.43	0.0031
0.17	0.4511	842.	528.	314.	0.9	1.46	0.0047
0.18	0.4506	1033.	677.	355.	1.1	1.49	0.0055
0.19	0.4490	1190.	760.	430.	1.7	1.49	0.0084
0.20	0.4479	1367.	874.	493.	2.1	1.50	0.0103
0.21	0.4470	1562.	1011.	552.	2.4	1.51	0.0120
0.22	0.4458	1789.	1157.	633.	2.9	1.52	0.0142
0.23	0.4448	2020.	1323.	697.	3.2	1.52	0.0158
0.24	0.4438	2284.	1501.	783.	3.6	1.53	0.0178
0.25	0.4423	2516.	1656.	861.	4.1	1.54	0.0204
0.26	0.4417	2801.	1867.	933.	4.3	1.54	0.0214
0.27	0.4401	3086.	2066.	1020.	4.9	1.56	0.0241
0.28	0.4385	3340.	2244.	1097.	5.5	1.56	0.0270
0.29	0.4378	3639.	2467.	1172.	5.7	1.57	0.0281
0.39	0.4250	6622.	4498.	2124.	10.1	1.67	0.0498
0.49	0.4147	9430.	6549.	2881.	13.5	1.76	0.0665
0.59	0.4047	11678.	8198.	3481.	16.6	1.84	0.0823
0.69	0.3975	13316.	9420.	3896.	18.9	1.90	0.0932
0.79	0.3921	14417.	10212.	4205.	20.5	1.95	0.1012
0.89	0.3880	15089.	10683.	4406.	21.7	1.98	0.1073
0.99	0.3844	15476.	10904.	4572.	22.8	2.00	0.1125
1.09	0.3820	15712.	11012.	4701.	23.5	2.01	0.1160
1.19	0.3803	15859.	11041.	4818.	23.9	2.03	0.1183

RHEOLOGY DATA FOR FILE
M3070.003

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
1.29	0.3792	15944.	11039.	4904.	24.2	2.03	0.1199
1.39	0.3775	15903.	10990.	4994.	24.7	2.04	0.1223
1.49	0.3762	16008.	10935.	5073.	25.1	2.04	0.1241
1.59	0.3754	16039.	10898.	5141.	25.3	2.05	0.1252
1.69	0.3751	16068.	10874.	5194.	25.4	2.04	0.1257
1.79	0.3744	16084.	10827.	5257.	25.6	2.05	0.1266
1.89	0.3737	16099.	10795.	5304.	25.8	2.05	0.1276
1.99	0.3723	16104.	10729.	5375.	26.2	2.05	0.1295
2.09	0.3725	16140.	10713.	5427.	26.1	2.05	0.1292
2.19	0.3720	16162.	10684.	5477.	26.3	2.06	0.1299
2.29	0.3717	16174.	10643.	5532.	26.4	2.06	0.1305
2.39	0.3710	16186.	10601.	5585.	26.6	2.06	0.1315
2.49	0.3699	16157.	10528.	5628.	26.9	2.06	0.1328
2.59	0.3703	16196.	10532.	5664.	26.8	2.06	0.1323
2.69	0.3695	16201.	10491.	5710.	27.0	2.07	0.1334
2.79	0.3688	16181.	10430.	5751.	27.2	2.06	0.1344
2.89	0.3687	16226.	10431.	5795.	27.2	2.07	0.1345
2.99	0.3687	16239.	10417.	5822.	27.2	2.06	0.1345
3.09	0.3681	16245.	10384.	5861.	27.4	2.07	0.1353
3.19	0.3676	16216.	10332.	5884.	27.5	2.06	0.1360
3.29	0.3672	16232.	10310.	5922.	27.6	2.07	0.1366
3.39	0.3677	16270.	10318.	5952.	27.5	2.07	0.1359
3.49	0.3667	16244.	10259.	5985.	27.8	2.06	0.1373
3.59	0.3673	16283.	10277.	6006.	27.6	2.07	0.1364
3.69	0.3670	16276.	10246.	6031.	27.7	2.07	0.1368
3.79	0.3661	16262.	10208.	6054.	27.9	2.07	0.1381
3.89	0.3665	16307.	10220.	6088.	27.8	2.07	0.1375
3.99	0.3656	16294.	10173.	6121.	28.1	2.07	0.1388
4.09	0.3658	16316.	10174.	6142.	28.0	2.07	0.1385
4.19	0.3656	16325.	10162.	6164.	28.1	2.07	0.1388
4.29	0.3654	16310.	10134.	6176.	28.1	2.07	0.1391
4.39	0.3655	16326.	10131.	6195.	28.1	2.07	0.1389
4.49	0.3652	16332.	10109.	6223.	28.2	2.07	0.1393
4.59	0.3644	16315.	10069.	6247.	28.4	2.07	0.1404
4.69	0.3648	16347.	10086.	6262.	28.3	2.07	0.1399
4.79	0.3645	16344.	10066.	6278.	28.4	2.07	0.1403

M3070.003



RHEOLOGY DATA FOR FILE
M3070.004

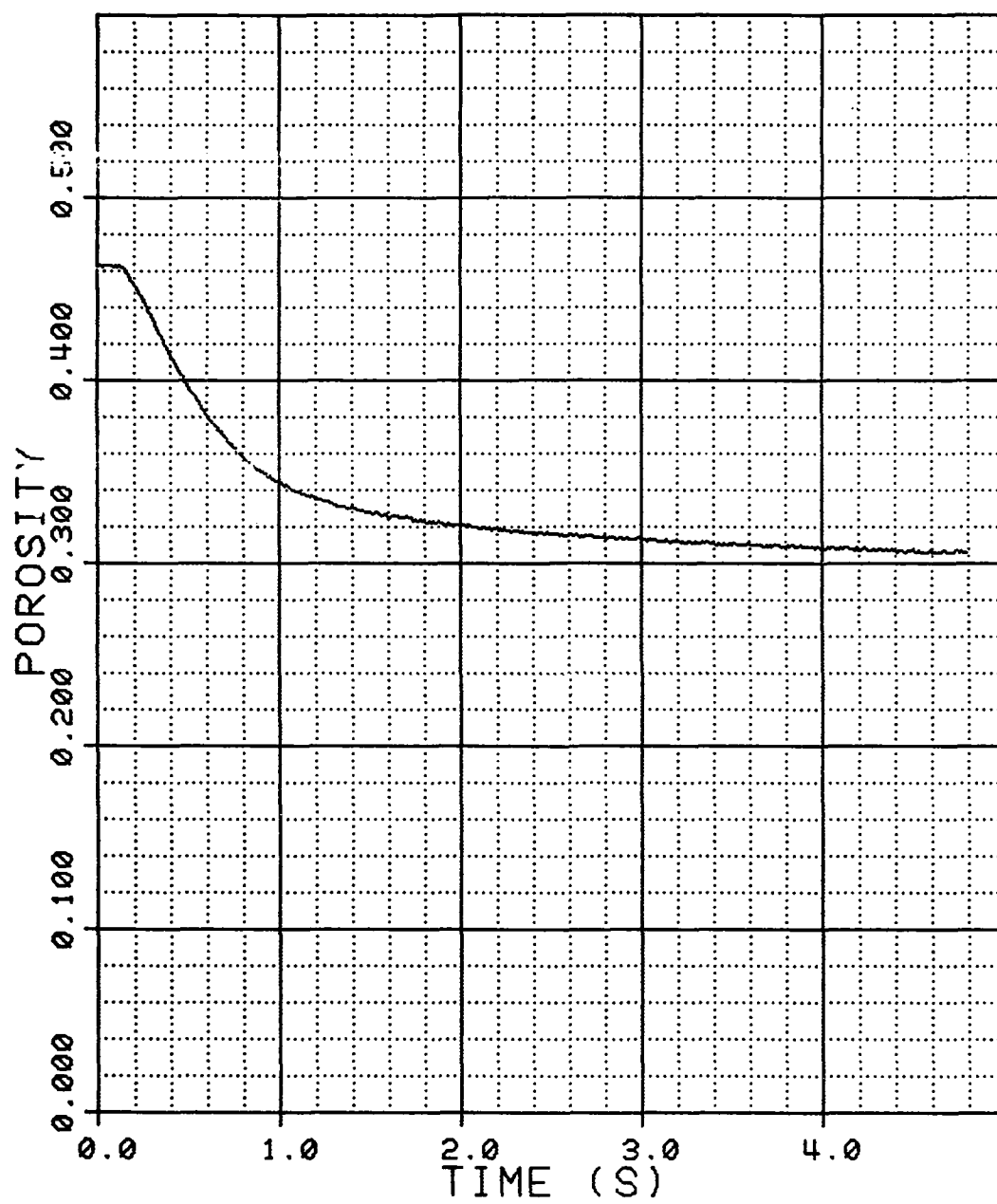
INITIAL HEIGHT OF BED 205.2 MM
MASS OF PROPELLANT 0.8750 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
0.00	0.4627	85.	115.	-30.	0.0	3.96	0.0000
0.01	0.4629	118.	153.	-36.	-0.1	3.96	-0.0004
0.02	0.4629	114.	153.	-39.	-0.1	3.96	-0.0004
0.03	0.4624	78.	115.	-37.	0.1	3.96	0.0005
0.04	0.4628	117.	149.	-32.	-0.1	3.96	-0.0003
0.05	0.4626	101.	135.	-34.	0.0	3.97	0.0002
0.06	0.4628	114.	152.	-38.	-0.1	3.96	-0.0003
0.07	0.4628	118.	159.	-42.	-0.1	3.96	-0.0003
0.08	0.4626	110.	138.	-28.	0.0	3.97	0.0001
0.09	0.4623	85.	115.	-30.	0.1	3.88	0.0007
0.10	0.4627	111.	142.	-31.	-0.0	3.43	-0.0001
0.11	0.4623	97.	121.	-24.	0.1	2.74	0.0007
0.12	0.4626	194.	170.	24.	0.0	2.47	0.0002
0.13	0.4621	334.	246.	88.	0.2	2.49	0.0010
0.14	0.4621	609.	445.	164.	0.2	2.61	0.0011
0.15	0.4609	897.	625.	272.	0.7	2.76	0.0033
0.16	0.4595	1230.	839.	391.	1.2	2.88	0.0059
0.17	0.4579	1556.	1039.	518.	1.8	2.93	0.0088
0.18	0.4561	1931.	1269.	663.	2.5	2.96	0.0120
0.19	0.4543	2317.	1509.	807.	3.1	2.98	0.0153
0.20	0.4527	2740.	1777.	962.	3.7	2.99	0.0181
0.21	0.4507	3190.	2046.	1144.	4.5	3.00	0.0218
0.22	0.4488	3672.	2348.	1324.	5.1	3.01	0.0251
0.23	0.4472	4151.	2666.	1484.	5.7	3.03	0.0279
0.24	0.4457	4671.	3040.	1631.	6.3	3.04	0.0305
0.25	0.4432	5148.	3361.	1787.	7.2	3.05	0.0350
0.26	0.4416	5687.	3764.	1923.	7.7	3.07	0.0378
0.27	0.4392	6208.	4134.	2075.	8.6	3.08	0.0418
0.28	0.4374	6762.	4541.	2221.	9.2	3.10	0.0450
0.29	0.4358	7347.	4983.	2364.	9.8	3.12	0.0477
0.39	0.4161	13068.	9233.	3835.	16.4	3.27	0.0797
0.49	0.3982	17959.	12817.	5142.	22.0	3.41	0.1072
0.59	0.3829	21536.	15396.	6141.	26.5	3.51	0.1292
0.69	0.3701	24464.	17365.	7099.	30.2	3.61	0.1469
0.79	0.3598	26755.	18919.	7836.	33.0	3.69	0.1607
0.89	0.3511	28245.	19793.	8452.	35.3	3.75	0.1720
0.99	0.3451	29176.	20243.	8933.	36.8	3.79	0.1795
1.09	0.3392	29758.	20444.	9315.	38.3	3.82	0.1868
1.19	0.3363	30164.	20586.	9578.	39.1	3.84	0.1904

RHEOLOGY DATA FOR FILE
M3070.004

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
1.29	0.3330	30406.	20617.	9789.	39.9	3.86	0.1944
1.39	0.3297	30532.	20560.	9965.	40.7	3.87	0.1984
1.49	0.3276	30638.	20510.	10120.	41.2	3.88	0.2000
1.59	0.3268	30711.	20459.	10252.	41.4	3.88	0.2018
1.69	0.3249	30751.	20350.	10401.	41.9	3.89	0.2041
1.79	0.3231	30800.	20251.	10549.	42.3	3.89	0.2062
1.89	0.3220	30850.	20173.	10677.	42.6	3.90	0.2075
1.99	0.3211	30897.	20081.	10816.	42.8	3.90	0.2085
2.09	0.3203	30935.	19996.	10939.	43.0	3.90	0.2094
2.19	0.3194	30966.	19897.	11068.	43.2	3.91	0.2105
2.29	0.3175	30980.	19783.	11196.	43.7	3.92	0.2127
2.39	0.3174	31009.	19706.	11303.	43.7	3.92	0.2128
2.49	0.3159	30995.	19599.	11396.	44.0	3.92	0.2146
2.59	0.3155	31036.	19527.	11509.	44.1	3.92	0.2150
2.69	0.3148	31033.	19444.	11589.	44.3	3.92	0.2158
2.79	0.3142	31073.	19374.	11699.	44.4	3.92	0.2165
2.89	0.3138	31093.	19325.	11768.	44.5	3.92	0.2169
2.99	0.3136	31093.	19252.	11840.	44.6	3.92	0.2172
3.09	0.3120	31092.	19164.	11927.	44.9	3.92	0.2190
3.19	0.3124	31110.	19125.	11993.	44.9	3.92	0.2185
3.29	0.3113	31107.	19040.	12067.	45.1	3.93	0.2198
3.39	0.3108	31120.	18981.	12139.	45.2	3.93	0.2203
3.49	0.3106	31145.	18953.	12193.	45.3	3.93	0.2206
3.59	0.3107	31174.	18909.	12264.	45.2	3.93	0.2204
3.69	0.3104	31186.	18865.	12321.	45.3	3.93	0.2209
3.79	0.3091	31176.	18793.	12383.	45.6	3.93	0.2222
3.89	0.3093	31214.	18782.	12432.	45.6	3.94	0.2221
3.99	0.3082	31191.	18707.	12484.	45.8	3.94	0.2233
4.09	0.3084	31232.	18699.	12534.	45.8	3.94	0.2230
4.19	0.3085	31236.	18668.	12568.	45.7	3.94	0.2229
4.29	0.3072	31210.	18592.	12617.	46.1	3.94	0.2244
4.39	0.3070	31235.	18567.	12668.	46.1	3.94	0.2247
4.49	0.3072	31242.	18544.	12698.	46.1	3.94	0.2244
4.59	0.3068	31245.	18505.	12740.	46.1	3.94	0.2248
4.69	0.3062	31253.	18465.	12788.	46.3	3.94	0.2255
4.79	0.3057	31250.	18434.	12816.	46.4	3.94	0.2260

M3070.004



RHEOLOGY DATA FOR FILE
M3070.005

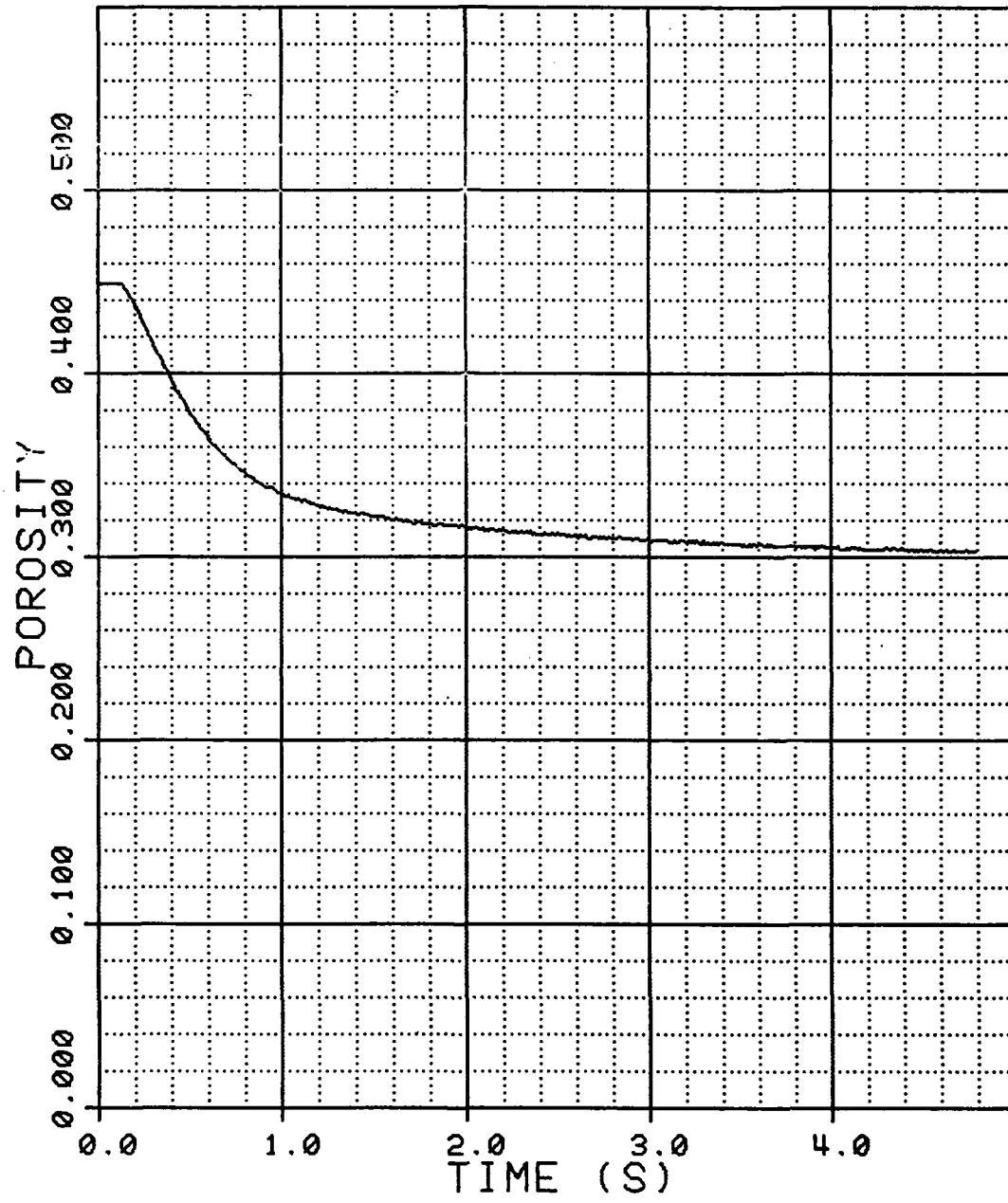
INITIAL HEIGHT OF BED 200.1 MM
MASS OF PROPELLANT 0.8748 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
0.00	0.4491	155.	182.	-27.	0.0	3.93	0.0000
0.01	0.4488	136.	166.	-30.	0.1	3.93	0.0004
0.02	0.4492	149.	183.	-33.	-0.0	3.93	-0.0002
0.03	0.4489	152.	168.	-16.	0.1	3.93	0.0003
0.04	0.4488	142.	158.	-16.	0.1	3.93	0.0004
0.05	0.4490	155.	168.	-13.	0.0	3.93	0.0001
0.06	0.4486	120.	141.	-22.	0.2	3.93	0.0008
0.07	0.4487	120.	145.	-25.	0.1	3.93	0.0007
0.08	0.4490	124.	149.	-26.	0.0	3.93	0.0000
0.09	0.4494	152.	182.	-30.	-0.1	3.87	-0.0006
0.10	0.4494	155.	182.	-27.	-0.1	3.47	-0.0006
0.11	0.4489	136.	162.	-26.	0.0	2.78	0.0002
0.12	0.4488	226.	180.	46.	0.1	2.47	0.0005
0.13	0.4488	413.	293.	120.	0.1	2.46	0.0005
0.14	0.4482	698.	446.	244.	0.3	2.59	0.0016
0.15	0.4464	996.	602.	394.	1.0	2.73	0.0048
0.16	0.4447	1385.	835.	550.	1.6	2.84	0.0078
0.17	0.4430	1801.	1092.	710.	2.2	2.91	0.0108
0.18	0.4411	2261.	1384.	878.	2.8	2.95	0.0142
0.19	0.4399	2775.	1730.	1046.	3.3	2.98	0.0164
0.20	0.4379	3304.	2073.	1232.	4.0	2.99	0.0198
0.21	0.4351	3825.	2398.	1427.	4.9	3.01	0.0247
0.22	0.4335	4423.	2794.	1629.	5.5	3.03	0.0275
0.23	0.4315	5007.	3181.	1826.	6.2	3.04	0.0310
0.24	0.4287	5602.	3563.	2039.	7.1	3.06	0.0356
0.25	0.4269	6225.	3993.	2231.	7.7	3.08	0.0386
0.26	0.4247	6840.	4404.	2436.	8.5	3.09	0.0423
0.27	0.4224	7443.	4800.	2643.	9.2	3.11	0.0462
0.28	0.4204	8070.	5231.	2839.	9.9	3.13	0.0495
0.29	0.4186	8711.	5674.	3037.	10.5	3.14	0.0523
0.39	0.3985	14575.	9703.	4872.	16.8	3.30	0.0840
0.49	0.3811	19669.	13178.	6491.	22.0	3.45	0.1098
0.59	0.3671	23529.	15858.	7671.	25.9	3.57	0.1295
0.69	0.3557	26214.	17650.	8564.	29.0	3.66	0.1449
0.79	0.3469	27957.	18711.	9246.	31.3	3.72	0.1565
0.89	0.3401	29017.	19303.	9714.	33.0	3.77	0.1651
0.99	0.3350	29619.	19550.	10069.	34.3	3.80	0.1716
1.09	0.3318	29961.	19618.	10343.	35.1	3.82	0.1755
1.19	0.3278	30175.	19549.	10626.	36.1	3.84	0.1804

RHEOLOGY DATA FOR FILE
M3070.005

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
1.29	0.3255	30330.	19460.	10870.	36.6	3.85	0.1832
1.39	0.3236	30423.	19346.	11070.	37.1	3.85	0.1855
1.49	0.3223	30536.	19265.	11271.	37.4	3.87	0.1871
1.59	0.3201	30563.	19114.	11449.	38.0	3.86	0.1897
1.69	0.3191	30635.	19016.	11619.	38.2	3.87	0.1908
1.79	0.3182	30660.	18920.	11740.	38.4	3.87	0.1919
1.89	0.3171	30694.	18801.	11893.	38.7	3.88	0.1932
1.99	0.3157	30716.	18692.	12023.	39.0	3.87	0.1949
2.09	0.3156	30782.	18627.	12155.	39.0	3.88	0.1950
2.19	0.3138	30775.	18507.	12267.	39.4	3.88	0.1971
2.29	0.3133	30797.	18436.	12361.	39.6	3.88	0.1977
2.39	0.3124	30809.	18345.	12463.	39.8	3.89	0.1988
2.49	0.3120	30865.	18289.	12576.	39.9	3.89	0.1992
2.59	0.3119	30875.	18224.	12651.	39.9	3.89	0.1993
2.69	0.3112	30912.	18150.	12762.	40.1	3.90	0.2002
2.79	0.3100	30905.	18066.	12839.	40.3	3.89	0.2016
2.89	0.3096	30896.	17994.	12902.	40.4	3.90	0.2020
2.99	0.3098	30953.	17974.	12979.	40.4	3.90	0.2017
3.09	0.3088	30934.	17877.	13057.	40.6	3.90	0.2030
3.19	0.3089	30978.	17850.	13128.	40.6	3.90	0.2028
3.29	0.3074	30955.	17758.	13196.	40.9	3.90	0.2045
3.39	0.3079	31000.	17748.	13252.	40.8	3.90	0.2040
3.49	0.3066	30989.	17666.	13323.	41.1	3.91	0.2055
3.59	0.3064	31011.	17638.	13373.	41.1	3.91	0.2056
3.69	0.3061	30992.	17568.	13424.	41.2	3.91	0.2061
3.79	0.3056	31002.	17536.	13465.	41.3	3.91	0.2066
3.89	0.3062	31040.	17533.	13508.	41.2	3.91	0.2059
3.99	0.3053	31049.	17476.	13572.	41.4	3.91	0.2069
4.09	0.3051	31040.	17440.	13600.	41.5	3.91	0.2072
4.19	0.3041	31042.	17383.	13659.	41.7	3.91	0.2083
4.29	0.3042	31077.	17375.	13702.	41.7	3.91	0.2081
4.39	0.3046	31084.	17351.	13733.	41.6	3.91	0.2077
4.49	0.3036	31061.	17292.	13769.	41.8	3.91	0.2088
4.59	0.3033	31073.	17264.	13810.	41.9	3.91	0.2093
4.69	0.3033	31098.	17257.	13841.	41.9	3.92	0.2093
4.79	0.3034	31096.	17237.	13859.	41.8	3.91	0.2091

M3070.005



RHEOLOGY DATA FOR FILE
M3070.006

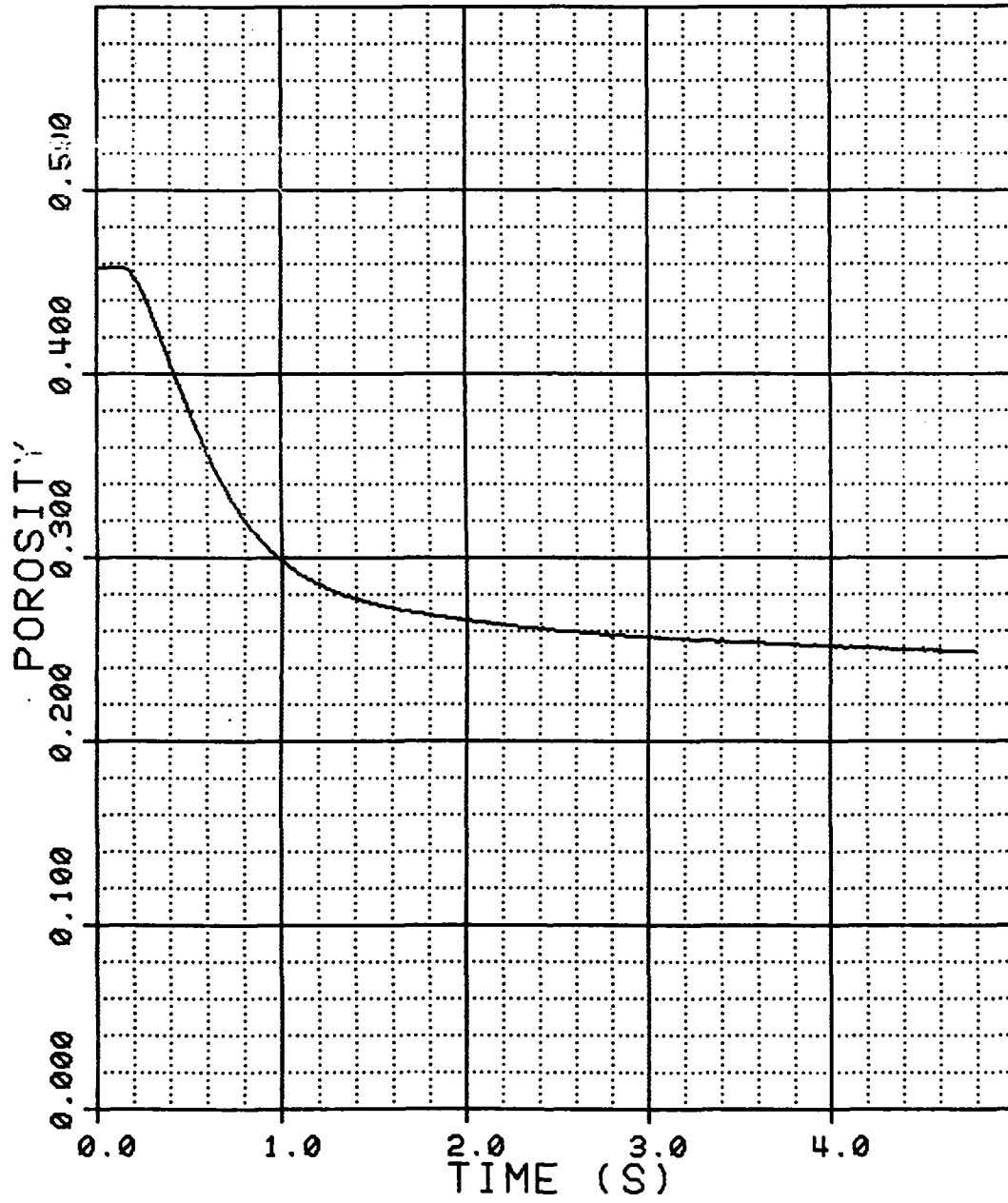
INITIAL HEIGHT OF BED 203.0 MM
MASS OF PROPELLANT 0.8767 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	--
0.00	0.4579	70.	111.	-41.	0.0	5.88	0.0000
0.01	0.4579	73.	111.	-38.	-0.0	5.88	-0.0001
0.02	0.4578	70.	111.	-41.	0.0	5.88	0.0000
0.03	0.4580	76.	111.	-35.	-0.0	5.88	-0.0002
0.04	0.4579	70.	108.	-38.	-0.0	5.88	-0.0000
0.05	0.4577	70.	111.	-41.	0.0	5.88	0.0002
0.06	0.4579	76.	115.	-38.	-0.0	5.88	-0.0001
0.07	0.4580	70.	111.	-41.	-0.0	5.88	-0.0002
0.08	0.4579	70.	111.	-41.	-0.0	5.88	-0.0000
0.09	0.4577	73.	111.	-38.	0.1	5.85	0.0003
0.10	0.4578	67.	115.	-48.	0.0	5.65	0.0001
0.11	0.4578	73.	115.	-41.	0.0	5.31	0.0001
0.12	0.4578	70.	115.	-45.	0.0	4.47	0.0001
0.13	0.4578	80.	111.	-32.	0.0	3.95	0.0001
0.14	0.4577	117.	124.	-7.	0.0	3.86	0.0002
0.15	0.4576	222.	169.	53.	0.1	3.96	0.0005
0.16	0.4572	403.	283.	120.	0.3	4.10	0.0013
0.17	0.4566	599.	407.	191.	0.5	4.22	0.0024
0.18	0.4557	841.	562.	279.	0.8	4.28	0.0039
0.19	0.4545	1118.	762.	355.	1.2	4.32	0.0061
0.20	0.4535	1444.	992.	452.	1.6	4.34	0.0080
0.21	0.4520	1814.	1255.	559.	2.2	4.36	0.0106
0.22	0.4504	2230.	1557.	674.	2.8	4.37	0.0135
0.23	0.4487	2709.	1903.	806.	3.4	4.39	0.0167
0.24	0.4464	3234.	2287.	947.	4.2	4.40	0.0206
0.25	0.4446	3806.	2713.	1093.	4.9	4.42	0.0239
0.26	0.4423	4422.	3161.	1261.	5.7	4.43	0.0279
0.27	0.4399	5065.	3647.	1418.	6.5	4.45	0.0320
0.28	0.4375	5758.	4155.	1603.	7.4	4.47	0.0361
0.29	0.4350	6448.	4679.	1769.	8.3	4.49	0.0405
0.39	0.4087	13947.	10199.	3748.	16.9	4.70	0.0831
0.49	0.3831	21064.	15496.	5568.	24.7	4.88	0.1211
0.59	0.3595	27714.	20418.	7296.	31.3	5.08	0.1536
0.69	0.3392	33103.	24357.	8747.	36.6	5.24	0.1795
0.79	0.3223	37336.	27386.	9950.	40.8	5.37	0.2001
0.89	0.3089	40553.	29631.	10921.	43.9	5.50	0.2156
0.99	0.2990	42557.	30949.	11608.	46.2	5.58	0.2267
1.09	0.2913	43744.	31581.	12163.	47.9	5.64	0.2350
1.19	0.2857	44440.	31813.	12628.	49.1	5.68	0.2411

RHEOLOGY DATA FOR FILE
M3070.006

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
1.29	0.2812	44850.	31841.	13009.	50.1	5.70	0.2457
1.39	0.2778	45121.	31705.	13416.	50.8	5.73	0.2493
1.49	0.2749	45311.	31504.	13806.	51.4	5.74	0.2523
1.59	0.2725	45453.	31295.	14158.	51.9	5.75	0.2548
1.69	0.2705	45572.	31070.	14502.	52.3	5.77	0.2568
1.79	0.2687	45658.	30879.	14779.	52.7	5.77	0.2586
1.89	0.2670	45746.	30698.	15048.	53.1	5.77	0.2604
1.99	0.2658	45836.	30491.	15344.	53.3	5.78	0.2616
2.09	0.2645	45885.	30326.	15559.	53.6	5.79	0.2629
2.19	0.2633	45957.	30107.	15850.	53.8	5.80	0.2641
2.29	0.2622	45994.	29926.	16068.	54.0	5.80	0.2652
2.39	0.2614	46035.	29739.	16296.	54.2	5.81	0.2660
2.49	0.2603	46047.	29609.	16438.	54.4	5.81	0.2671
2.59	0.2597	46084.	29393.	16691.	54.6	5.81	0.2677
2.69	0.2592	46119.	29307.	16812.	54.7	5.82	0.2682
2.79	0.2575	46130.	29113.	17017.	55.0	5.82	0.2699
2.89	0.2572	46171.	28980.	17192.	55.1	5.82	0.2701
2.99	0.2568	46199.	28837.	17362.	55.1	5.82	0.2705
3.09	0.2561	46221.	28716.	17504.	55.3	5.83	0.2712
3.19	0.2554	46246.	28602.	17644.	55.4	5.83	0.2719
3.29	0.2548	46271.	28494.	17777.	55.5	5.83	0.2725
3.39	0.2544	46289.	28392.	17897.	55.6	5.84	0.2729
3.49	0.2537	46302.	28297.	18005.	55.8	5.84	0.2736
3.59	0.2536	46317.	28202.	18116.	55.8	5.84	0.2737
3.69	0.2530	46339.	28119.	18220.	55.9	5.84	0.2742
3.79	0.2526	46354.	28034.	18321.	56.0	5.84	0.2747
3.89	0.2520	46373.	27954.	18419.	56.1	5.85	0.2752
3.99	0.2517	46392.	27887.	18505.	56.1	5.85	0.2755
4.09	0.2514	46398.	27811.	18587.	56.2	5.85	0.2758
4.19	0.2509	46414.	27748.	18666.	56.3	5.85	0.2763
4.29	0.2506	46426.	27684.	18742.	56.4	5.85	0.2766
4.39	0.2502	46442.	27627.	18815.	56.5	5.86	0.2770
4.49	0.2499	46454.	27564.	18891.	56.5	5.86	0.2773
4.59	0.2495	46464.	27512.	18951.	56.6	5.86	0.2777
4.69	0.2492	46476.	27462.	19014.	56.6	5.86	0.2779
4.79	0.2487	46488.	27417.	19071.	56.7	5.87	0.2784

M3070.006



RHEOLOGY DATA FOR FILE
M3070.007

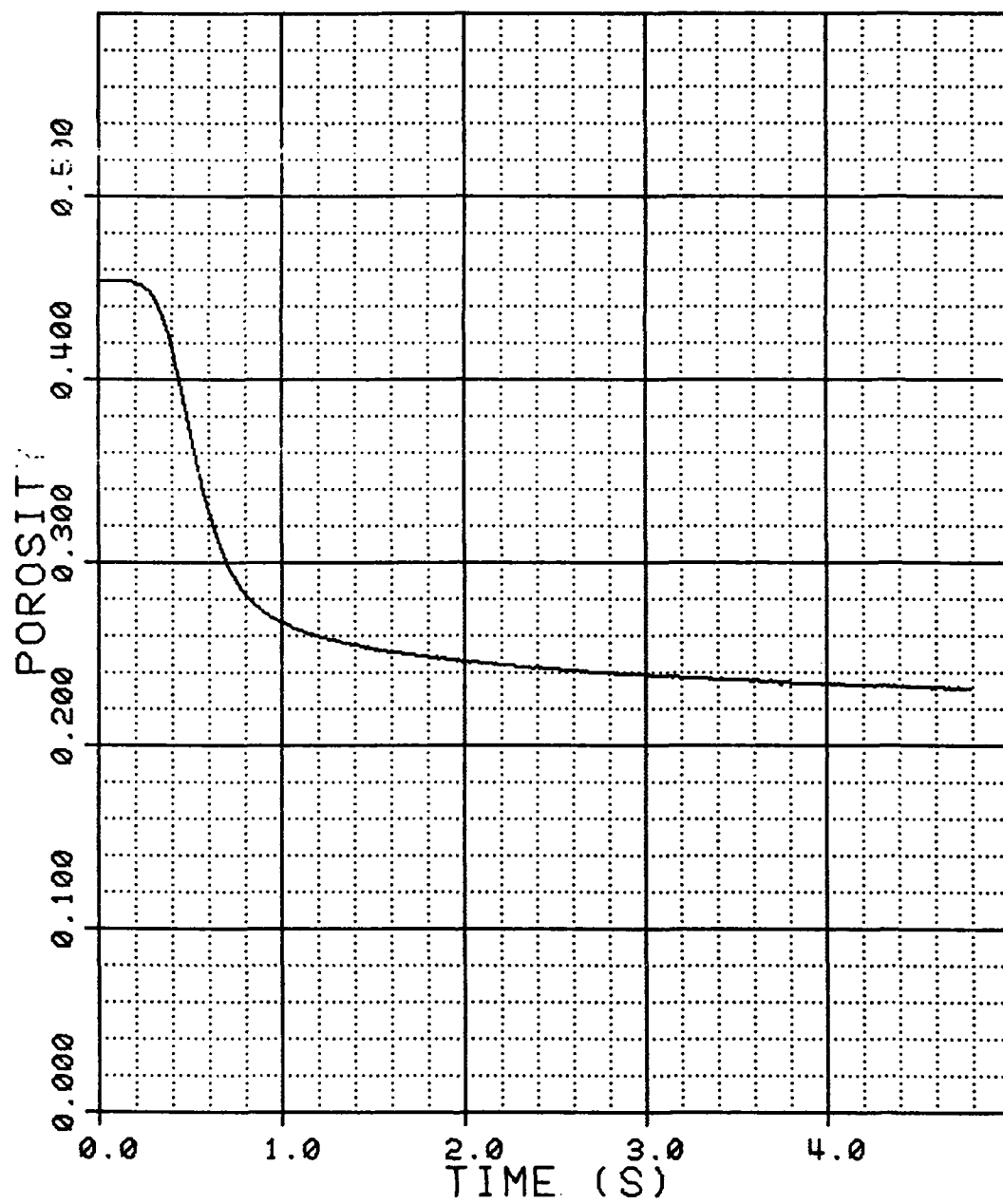
INITIAL HEIGHT OF BED 202.3 MM
MASS OF PROPELLANT 0.8758 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
0.00	0.4543	112.	165.	-53.	0.0	5.89	0.0000
0.01	0.4543	112.	165.	-53.	0.0	5.89	0.0001
0.02	0.4544	119.	165.	-47.	-0.0	5.89	-0.0001
0.03	0.4543	112.	162.	-50.	0.0	5.89	0.0001
0.04	0.4543	112.	159.	-47.	-0.0	5.89	-0.0000
0.05	0.4544	115.	162.	-47.	-0.0	5.75	-0.0001
0.06	0.4541	112.	162.	-50.	0.1	4.86	0.0004
0.07	0.4544	119.	159.	-40.	-0.0	3.90	-0.0001
0.08	0.4544	119.	159.	-40.	-0.0	4.12	-0.0002
0.09	0.4543	120.	165.	-38.	-0.0	4.32	-0.0000
0.10	0.4543	131.	172.	-41.	-0.0	4.38	-0.0000
0.11	0.4542	150.	184.	-34.	0.1	4.39	0.0003
0.12	0.4541	159.	188.	-29.	0.1	4.38	0.0004
0.13	0.4540	165.	188.	-22.	0.1	4.38	0.0005
0.14	0.4541	190.	200.	-10.	0.1	4.38	0.0004
0.15	0.4543	233.	222.	11.	0.0	4.37	0.0001
0.16	0.4539	321.	267.	54.	0.2	4.37	0.0000
0.17	0.4539	408.	305.	102.	0.2	4.36	0.0000
0.18	0.4536	486.	333.	152.	0.3	4.36	0.0014
0.19	0.4532	557.	362.	194.	0.4	4.36	0.0021
0.20	0.4533	653.	395.	258.	0.4	4.35	0.0019
0.21	0.4524	743.	445.	298.	0.7	4.35	0.0035
0.22	0.4523	849.	499.	350.	0.8	4.35	0.0038
0.23	0.4517	967.	569.	398.	1.0	4.35	0.0048
0.24	0.4509	1101.	648.	452.	1.2	4.36	0.0062
0.25	0.4504	1253.	737.	516.	1.4	4.35	0.0072
0.26	0.4494	1434.	845.	589.	1.8	4.35	0.0090
0.27	0.4486	1642.	979.	663.	2.1	4.36	0.0104
0.28	0.4476	1878.	1131.	747.	2.5	4.36	0.0122
0.29	0.4463	2142.	1303.	839.	2.9	4.37	0.0145
0.39	0.4209	8442.	5489.	2953.	11.7	4.53	0.0578
0.49	0.3748	21534.	14630.	6903.	25.7	4.89	0.1272
0.59	0.3319	33639.	23304.	10335.	37.1	5.24	0.1833
0.69	0.3017	40790.	20246.	12544.	44.2	5.47	0.2185
0.79	0.2838	44044.	30167.	13877.	48.2	5.61	0.2381
0.89	0.2739	45135.	30409.	14727.	50.3	5.67	0.2484
0.99	0.2676	45243.	29939.	15305.	51.6	5.70	0.2549
1.09	0.2633	45455.	29583.	15872.	52.4	5.71	0.2593
1.19	0.2599	45635.	29271.	16364.	53.1	5.73	0.2627

RHEOLOGY DATA FOR FILE
M3070.007

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
1.29	0.2575	45778.	28989.	16789.	53.6	5.74	0.2651
1.39	0.2551	45890.	28722.	17168.	54.1	5.75	0.2675
1.49	0.2531	45986.	28484.	17503.	54.5	5.77	0.2695
1.59	0.2513	46064.	28262.	17802.	54.8	5.78	0.2711
1.69	0.2499	46133.	28071.	18062.	55.1	5.79	0.2726
1.79	0.2487	46198.	27883.	18315.	55.4	5.80	0.2737
1.89	0.2477	46272.	27734.	18538.	55.6	5.80	0.2747
1.99	0.2462	46328.	27591.	18737.	55.8	5.80	0.2761
2.09	0.2453	46390.	27474.	18916.	56.0	5.82	0.2769
2.19	0.2442	46449.	27363.	19087.	56.2	5.82	0.2781
2.29	0.2433	46502.	27271.	19231.	56.4	5.84	0.2789
2.39	0.2425	46561.	27185.	19377.	56.6	5.84	0.2796
2.49	0.2419	46624.	27112.	19512.	56.7	5.84	0.2802
2.59	0.2411	46655.	27035.	19619.	56.8	5.84	0.2810
2.69	0.2405	46682.	26959.	19723.	57.0	5.85	0.2816
2.79	0.2399	46711.	26896.	19815.	57.1	5.85	0.2821
2.89	0.2390	46738.	26839.	19900.	57.2	5.86	0.2830
2.99	0.2385	46763.	26785.	19979.	57.3	5.86	0.2834
3.09	0.2379	46738.	26724.	20014.	57.4	5.87	0.2840
3.19	0.2373	46801.	26673.	20127.	57.6	5.86	0.2845
3.29	0.2369	46838.	26642.	20196.	57.6	5.86	0.2850
3.39	0.2363	46860.	26607.	20253.	57.8	5.87	0.2855
3.49	0.2360	46875.	26562.	20313.	57.8	5.87	0.2858
3.59	0.2355	46885.	26524.	20360.	57.9	5.87	0.2862
3.69	0.2358	46900.	26496.	20404.	57.8	5.87	0.2859
3.79	0.2347	46913.	26458.	20455.	58.0	5.88	0.2869
3.89	0.2343	46928.	26429.	20499.	58.1	5.88	0.2874
3.99	0.2337	46931.	26400.	20531.	58.2	5.88	0.2879
4.09	0.2335	46940.	26372.	20569.	58.3	5.89	0.2881
4.19	0.2329	46953.	26343.	20610.	58.4	5.89	0.2886
4.29	0.2328	46962.	26324.	20638.	58.4	5.88	0.2888
4.39	0.2325	46959.	26295.	20664.	58.5	5.89	0.2891
4.49	0.2320	46972.	26273.	20698.	58.6	5.89	0.2895
4.59	0.2316	46987.	26255.	20732.	58.6	5.89	0.2899
4.69	0.2313	46997.	26235.	20762.	58.7	5.89	0.2902
4.79	0.2309	47015.	26222.	20793.	58.8	5.89	0.2905

M3070.007



RHEOLOGY DATA FOR FILE
M3070.000

INITIAL HEIGHT OF BED 200.1 MM
MASS OF PROPELLANT 0.0753 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTAT = 0.20. PRINTING EVERY STEP

0.00	0.4487	123.	137.	-14.	0.0	7.89	0.0000
0.20	0.4425	2103.	1078.	1025.	2.2	5.89	0.0111
0.40	0.3732	23773.	14393.	9380.	24.1	6.57	0.1205
0.60	0.3094	43119.	27323.	15796.	40.4	7.00	0.2018
0.80	0.2657	55417.	35277.	20140.	49.9	7.46	0.2493
1.00	0.2432	59073.	37528.	22345.	54.3	7.64	0.2715
1.20	0.2314	61014.	37506.	23508.	56.6	7.71	0.2827
1.40	0.2247	61390.	36997.	24392.	57.8	7.73	0.2890
1.60	0.2196	61601.	36496.	25105.	58.7	7.76	0.2936
1.80	0.2161	61757.	36051.	25705.	59.4	7.77	0.2968
2.00	0.2133	61807.	35654.	26233.	59.9	7.78	0.2993
2.20	0.2109	61993.	35317.	26675.	60.3	7.81	0.3014
2.40	0.2090	62079.	35022.	27057.	60.7	7.82	0.3031
2.60	0.2070	62151.	34750.	27393.	61.0	7.83	0.3049
2.80	0.2054	62238.	34539.	27699.	61.3	7.84	0.3062
3.00	0.2037	62341.	34362.	27979.	61.6	7.84	0.3077
3.20	0.2029	62390.	34181.	28210.	61.7	7.84	0.3084
3.40	0.2017	62452.	34010.	28434.	61.9	7.84	0.3095
3.60	0.2006	62499.	33888.	28611.	62.1	7.85	0.3104
3.80	0.1996	62546.	33771.	28775.	62.3	7.86	0.3113
4.00	0.1986	62589.	33663.	28926.	62.5	7.86	0.3122
4.20	0.1980	62639.	33564.	29075.	62.6	7.87	0.3127
4.40	0.1971	62667.	33479.	29180.	62.7	7.88	0.3134
4.60	0.1964	62717.	33405.	29311.	62.8	7.87	0.3140
4.80	0.1956	62729.	33326.	29403.	63.0	7.87	0.3147
5.00	0.1948	62744.	33259.	29485.	63.1	7.88	0.3153
5.20	0.1942	62769.	33196.	29573.	63.2	7.88	0.3158
5.40	0.1937	62794.	33145.	29649.	63.3	7.89	0.3163
5.60	0.1931	62822.	33094.	29728.	63.4	7.90	0.3169

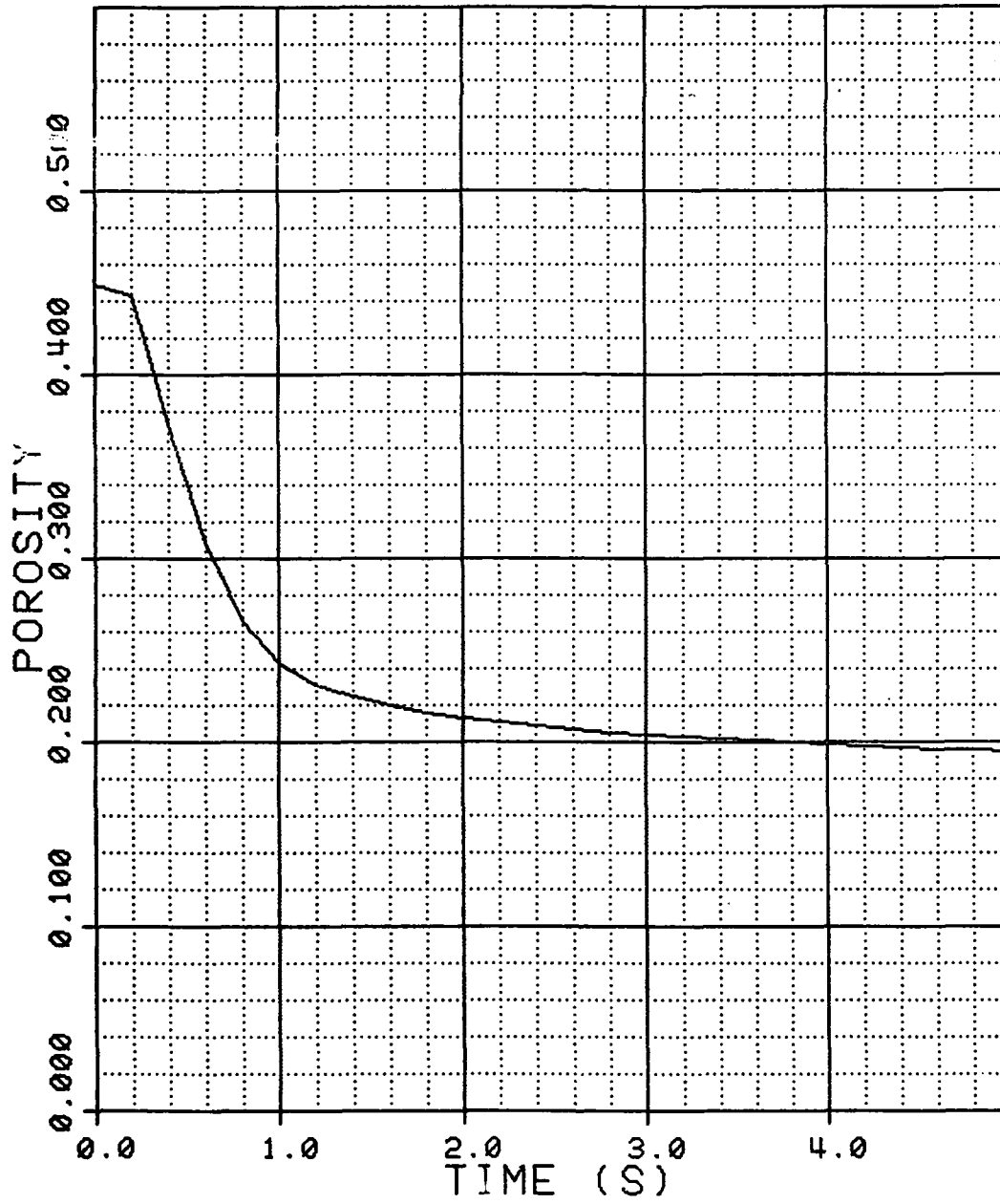
PRINTING EVERY 10 STEPS

5.80	0.1926	62822.	33040.	29782.	63.5	7.90	0.3172
7.00	0.1880	62919.	32694.	30225.	64.3	7.91	0.3211
9.00	0.1849	62950.	32494.	30456.	64.8	7.90	0.3236
11.00	0.1822	62953.	32363.	30589.	65.2	7.92	0.3260
13.00	0.1801	62965.	32290.	30675.	65.6	7.90	0.3276
15.00	0.1786	62965.	32233.	30732.	65.8	7.91	0.3288
17.00	0.1769	62943.	32192.	30751.	66.1	7.91	0.3303

RHEOLOGY DATA FOR FILE
M3070.000

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
19.00	0.1753	62950.	32167.	30783.	66.3	7.90	0.3315
21.00	0.1740	62943.	32151.	30793.	66.6	7.91	0.3326
23.00	0.1736	62950.	32145.	30805.	66.6	7.91	0.3330
25.00	0.1722	62940.	32135.	30805.	66.8	7.89	0.3340
27.00	0.1713	62950.	32129.	30821.	67.0	7.93	0.3348
29.00	0.1704	62944.	32132.	30812.	67.1	7.92	0.3355
31.00	0.1699	62944.	32132.	30812.	67.2	7.92	0.3359
33.00	0.1689	62944.	32132.	30812.	67.4	7.91	0.3367
35.00	0.1682	62940.	32139.	30802.	67.5	7.92	0.3372
37.00	0.1676	62925.	32135.	30790.	67.6	7.92	0.3377
39.00	0.1671	62931.	32142.	30790.	67.7	7.92	0.3381
41.00	0.1664	62931.	32148.	30783.	67.8	7.92	0.3387
43.00	0.1660	62928.	32154.	30774.	67.8	7.92	0.3390
45.00	0.1655	62922.	32161.	30761.	67.9	7.91	0.3394
47.00	0.1651	62916.	32167.	30749.	68.0	7.92	0.3397
49.00	0.1645	62922.	32173.	30749.	68.1	7.92	0.3402
51.00	0.1640	62919.	32186.	30733.	68.1	7.92	0.3406
53.00	0.1636	62916.	32196.	30720.	68.2	7.91	0.3409
55.00	0.1633	62909.	32208.	30701.	68.3	7.92	0.3411
57.00	0.1629	62916.	32211.	30704.	68.3	7.92	0.3414
59.00	0.1626	62916.	32227.	30688.	68.4	7.92	0.3417
61.00	0.1623	62909.	32240.	30669.	68.4	7.93	0.3419
63.00	0.1619	62903.	32250.	30653.	68.5	7.92	0.3422
65.00	0.1616	62913.	32265.	30647.	68.5	7.91	0.3425
67.00	0.1611	62909.	32272.	30638.	68.6	7.92	0.3429
69.00	0.1611	62900.	32285.	30615.	68.6	7.92	0.3429
71.00	0.1609	62900.	32291.	30609.	68.6	7.92	0.3430
73.00	0.1605	62906.	32310.	30597.	68.7	7.92	0.3434
75.00	0.1602	62916.	32310.	30596.	68.8	7.92	0.3436
77.00	0.1600	62912.	32335.	30577.	68.8	7.92	0.3437
79.00	0.1598	62900.	32338.	30562.	68.8	7.93	0.3439
81.00	0.1595	62900.	32361.	30539.	68.9	7.93	0.3441
83.00	0.1593	62909.	32370.	30539.	68.9	7.90	0.3443
85.00	0.1591	62919.	32390.	30529.	68.9	7.91	0.3445
87.00	0.1588	62909.	32396.	30514.	69.0	7.90	0.3447
89.00	0.1585	62906.	32408.	30498.	69.0	7.90	0.3449
91.00	0.1583	62897.	32421.	30476.	69.0	7.91	0.3450
93.00	0.1582	62900.	32437.	30463.	69.1	7.90	0.3451
95.00	0.1579	62915.	32453.	30463.	69.1	7.90	0.3454
97.00	0.1579	62925.	32469.	30456.	69.1	7.91	0.3454
99.00	0.1575	62922.	32482.	30440.	69.2	7.91	0.3457

M3070.008



RHEOLOGY DATA FOR FILE
M3070.009

INITIAL HEIGHT OF BED 203.9 MM
MASS OF PROPELLANT 0.8763 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
DELTAT = 0.04, PRINTING EVERY STEP							
0.00	0.4584	117.	167.	-50.	0.0	8.03	0.0000
0.04	0.4587	110.	161.	-51.	-0.1	8.03	-0.0006
0.08	0.4584	117.	167.	-50.	0.0	8.03	0.0000
0.12	0.4584	116.	167.	-51.	-0.0	7.50	-0.0001
0.16	0.4584	169.	173.	-4.	-0.0	5.28	-0.0001
0.20	0.4562	791.	558.	233.	0.8	5.62	0.0039
0.24	0.4515	1981.	1415.	566.	2.6	5.68	0.0126
0.28	0.4432	4116.	2949.	1167.	5.6	5.75	0.0273
0.32	0.4325	6928.	5019.	1909.	9.3	5.84	0.0456
0.36	0.4204	10474.	7629.	2845.	13.4	5.95	0.0655
0.40	0.4078	14370.	10502.	3868.	17.4	6.07	0.0853
0.44	0.3953	18415.	13522.	4894.	21.3	6.19	0.1043
0.48	0.3823	22147.	16261.	5886.	25.1	6.29	0.1231
0.52	0.3700	25854.	19059.	6795.	28.6	6.40	0.1403
0.56	0.3575	29477.	21782.	7695.	32.0	6.52	0.1570
0.60	0.3457	33001.	24475.	8526.	35.1	6.63	0.1722
0.64	0.3348	36496.	27212.	9284.	37.9	6.74	0.1856
0.68	0.3238	39898.	29853.	10045.	40.6	6.85	0.1990
0.72	0.3139	42956.	32218.	10738.	42.9	6.95	0.2105
0.76	0.3044	45718.	34339.	11379.	45.1	7.05	0.2213
0.80	0.2956	48163.	36228.	11935.	47.1	7.14	0.2310
0.84	0.2878	50223.	37784.	12440.	48.8	7.21	0.2395
0.88	0.2801	52103.	39174.	12929.	50.5	7.30	0.2476
0.92	0.2734	53809.	40441.	13368.	51.9	7.37	0.2545
0.96	0.2674	55279.	41536.	13743.	53.2	7.43	0.2607
1.00	0.2619	56583.	42438.	14065.	54.3	7.49	0.2662
1.04	0.2575	57513.	43168.	14345.	55.2	7.54	0.2705
1.08	0.2529	58321.	43727.	14594.	56.1	7.58	0.2750
1.12	0.2494	58970.	44158.	14811.	56.8	7.62	0.2784

PRINTING EVERY 10 STEPS

1.16	0.2458	59508.	44498.	15010.	57.5	7.65	0.2818
1.56	0.2255	61695.	45457.	16238.	61.3	7.80	0.3006
1.96	0.2156	62307.	45120.	17187.	63.1	7.86	0.3095
2.36	0.2096	62636.	44587.	18050.	64.2	7.89	0.3147
2.76	0.2054	62860.	44060.	18801.	64.9	7.92	0.3183
3.16	0.2019	63041.	43593.	19447.	65.5	7.94	0.3213
3.56	0.1990	63162.	43171.	19991.	66.0	7.96	0.3238

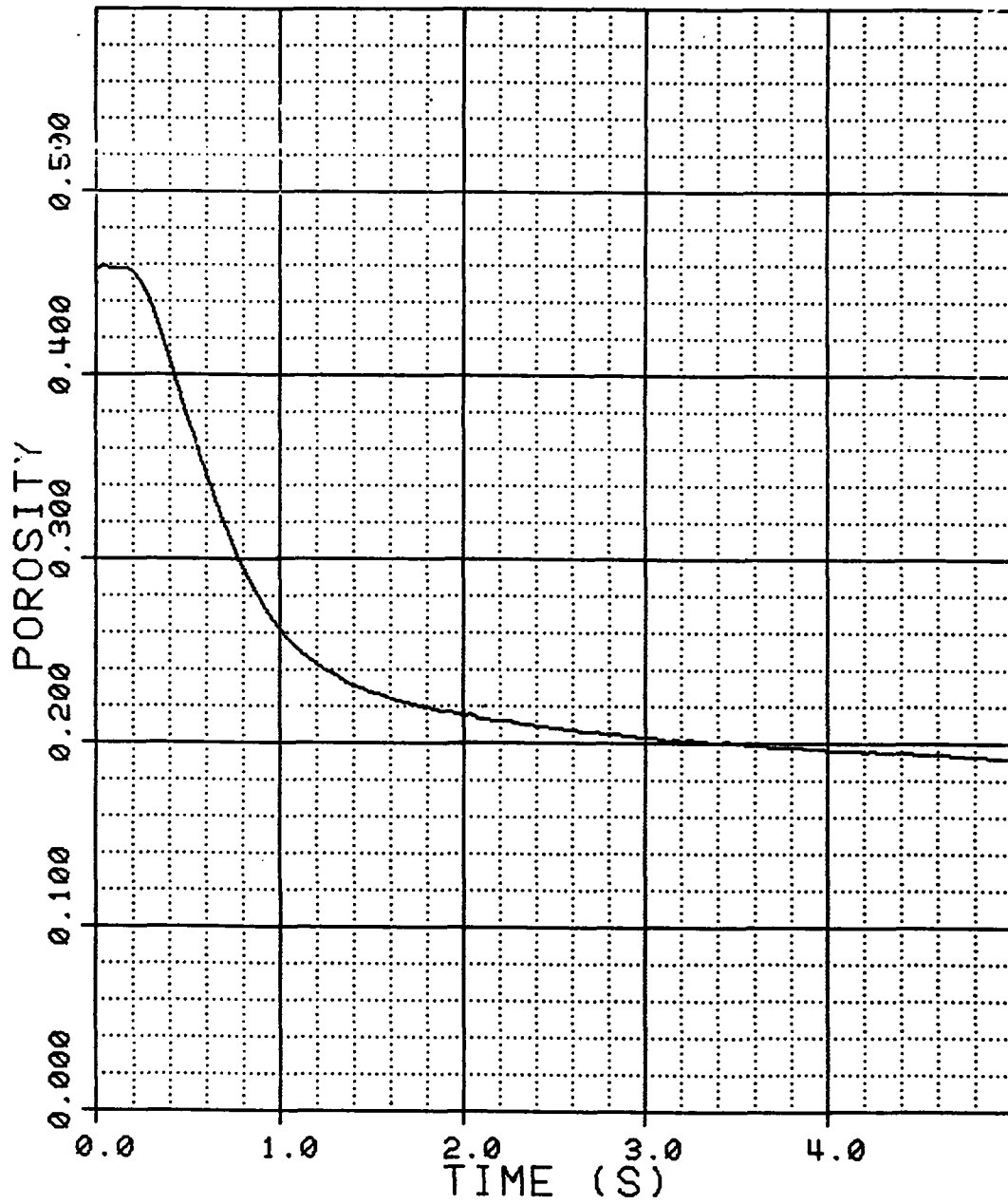
RHEOLOGY DATA FOR FILE
M3070.009

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.1969	63304.	42822.	20483.	66.4	7.97	0.3256
4.36	0.1948	63441.	42543.	20899.	66.7	7.98	0.3273
4.76	0.1929	63544.	42276.	21268.	67.1	7.99	0.3289
5.16	0.1915	63610.	42041.	21570.	67.3	7.99	0.3301
5.56	0.1901	63662.	41815.	21847.	67.5	8.00	0.3312
5.96	0.1889	63709.	41619.	22090.	67.7	8.01	0.3322
6.36	0.1879	63733.	41428.	22305.	67.9	8.01	0.3331
6.76	0.1868	63768.	41272.	22495.	68.1	8.02	0.3339
7.16	0.1856	63789.	41127.	22662.	68.3	8.02	0.3349
7.56	0.1851	63796.	40984.	22812.	68.4	8.02	0.3353
7.96	0.1841	63820.	40860.	22961.	68.5	8.02	0.3361
8.36	0.1834	63820.	40729.	23091.	68.7	8.03	0.3367
8.76	0.1825	63833.	40625.	23208.	68.8	8.03	0.3374
9.16	0.1820	63842.	40511.	23331.	68.9	8.02	0.3378
9.56	0.1813	63870.	40435.	23436.	69.0	8.02	0.3384
9.96	0.1806	63873.	40339.	23534.	69.1	8.02	0.3390

DELTAT = 0.50. PRINTING EVERY 10 STEPS

14.96	0.1753	63870.	39599.	24271.	70.0	8.03	0.3432
19.96	0.1713	63858.	39139.	24719.	70.6	8.03	0.3464
24.96	0.1686	63845.	38837.	25008.	71.1	8.03	0.3485
29.96	0.1663	63845.	38624.	25221.	71.4	8.02	0.3503
34.96	0.1646	63845.	38475.	25371.	71.7	8.03	0.3516
39.96	0.1629	63839.	38361.	25470.	72.0	8.02	0.3529
44.96	0.1615	63839.	38259.	25580.	72.2	8.02	0.3541
49.96	0.1605	63830.	38183.	25647.	72.3	8.02	0.3548
54.96	0.1593	63830.	38113.	25717.	72.5	8.03	0.3557
59.96	0.1583	63833.	38059.	25774.	72.7	8.02	0.3565
64.96	0.1573	63848.	38015.	25834.	72.8	8.03	0.3573
69.96	0.1566	63842.	37983.	25859.	73.0	8.04	0.3578
74.96	0.1555	63855.	37952.	25902.	73.1	8.03	0.3586
79.96	0.1550	63857.	37921.	25936.	73.2	8.03	0.3590
84.96	0.1543	63876.	37899.	25977.	73.3	8.04	0.3596
89.96	0.1536	63867.	37892.	25976.	73.4	8.02	0.3601
94.96	0.1531	63882.	37870.	26012.	73.5	8.03	0.3604
99.96	0.1526	63867.	37868.	26000.	73.6	8.03	0.3608
104.96	0.1523	63877.	37857.	26019.	73.6	8.03	0.3611
109.96	0.1515	63895.	37856.	26039.	73.7	8.03	0.3616
114.96	0.1514	63908.	37843.	26065.	73.8	8.04	0.3617
119.96	0.1509	63917.	37820.	26097.	73.8	8.04	0.3621
124.96	0.1504	63920.	37849.	26071.	73.9	8.03	0.3625
129.96	0.1506	63933.	37836.	26097.	73.9	8.04	0.3624
134.96	0.1502	63945.	37822.	26123.	73.9	8.07	0.3626

M3070.009



RHEOLOGY DATA FOR FILE
M3070.010

INITIAL HEIGHT OF BED 204.2 MM
MASS OF PROPELLANT 0.8748 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
DELTAT = 0.04, PRINTING EVERY STEP							
0.00	0.4601	112.	125.	-13.	0.0	7.98	0.0000
0.04	0.4598	115.	124.	-10.	0.1	7.98	0.0006
0.08	0.4599	115.	121.	-7.	0.1	7.98	0.0005
0.12	0.4599	112.	125.	-13.	0.1	7.41	0.0004
0.16	0.4596	283.	185.	98.	0.2	5.29	0.0009
0.20	0.4560	1264.	868.	397.	1.6	5.64	0.0077
0.24	0.4480	3163.	2262.	901.	4.5	5.72	0.0220
0.28	0.4371	6068.	4399.	1669.	8.3	5.81	0.0409
0.32	0.4249	9642.	7021.	2620.	12.5	5.93	0.0614
0.36	0.4120	13529.	9958.	3570.	16.7	6.03	0.0819
0.40	0.3990	17428.	13016.	4412.	20.8	6.14	0.1017
0.44	0.3858	21154.	15966.	5188.	24.7	6.25	0.1211
0.48	0.3729	24848.	18858.	5991.	28.4	6.36	0.1392
0.52	0.3605	28452.	21668.	6785.	31.8	6.47	0.1559
0.56	0.3482	31793.	24255.	7538.	35.1	6.57	0.1718
0.60	0.3367	34903.	26770.	8133.	38.0	6.67	0.1861
0.64	0.3252	38154.	29440.	8714.	40.8	6.78	0.2000
0.68	0.3147	41280.	32059.	9220.	43.3	6.88	0.2122
0.72	0.3047	44123.	34415.	9708.	45.7	6.97	0.2236
0.76	0.2954	46693.	36542.	10150.	47.8	7.06	0.2339
0.80	0.2869	48998.	38476.	10522.	49.6	7.14	0.2430
0.84	0.2788	51037.	40171.	10865.	51.3	7.22	0.2514
0.88	0.2714	52932.	41749.	11183.	52.9	7.30	0.2590
0.92	0.2653	54585.	43140.	11445.	54.2	7.37	0.2652
0.96	0.2593	55961.	44296.	11666.	55.4	7.43	0.2712
1.00	0.2544	57058.	45207.	11851.	56.4	7.49	0.2760
1.04	0.2497	57919.	45902.	12017.	57.3	7.54	0.2805
1.08	0.2456	58605.	46442.	12164.	58.1	7.58	0.2844
1.12	0.2422	59165.	46886.	12279.	58.7	7.61	0.2877

PRINTING EVERY 10 STEPS

1.16	0.2390	59616.	47226.	12390.	59.3	7.64	0.2906
1.56	0.2195	61442.	48232.	13210.	63.0	7.76	0.3083
1.96	0.2096	62039.	48867.	13972.	64.7	7.82	0.3170
2.36	0.2031	62390.	47743.	14647.	65.9	7.85	0.3225
2.76	0.1983	62636.	47381.	15254.	66.7	7.88	0.3266
3.16	0.1948	62813.	47009.	15803.	67.3	7.90	0.3295
3.56	0.1922	62956.	46654.	16301.	67.8	7.91	0.3317

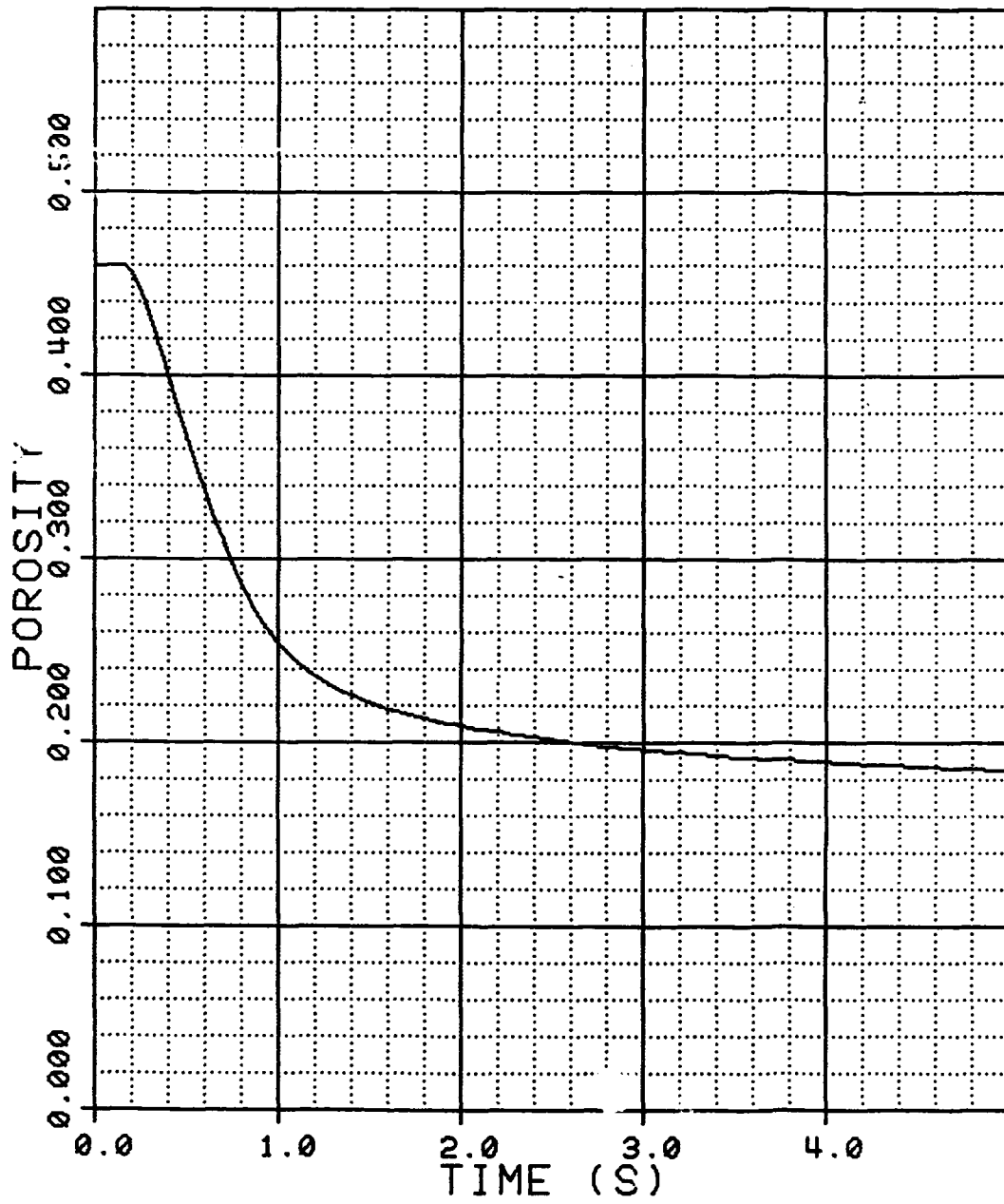
RHEOLOGY DATA FOR FILE
M3070.010

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.1896	63077.	46299.	16778.	68.2	7.93	0.3339
4.36	0.1876	63189.	45981.	17208.	68.5	7.94	0.3355
4.76	0.1858	63282.	45689.	17592.	68.8	7.94	0.3369
5.16	0.1838	63206.	45375.	17831.	69.2	7.96	0.3386
5.56	0.1827	63415.	45149.	18266.	69.3	7.96	0.3394
5.96	0.1814	63468.	44908.	18560.	69.5	7.97	0.3405
6.36	0.1803	63505.	44676.	18829.	69.7	7.98	0.3414
6.76	0.1792	63521.	44460.	19061.	69.9	7.98	0.3423
7.16	0.1786	63556.	44264.	19292.	70.0	7.98	0.3427
7.56	0.1773	63574.	44086.	19488.	70.2	7.98	0.3438
7.96	0.1765	63574.	43908.	19666.	70.3	7.98	0.3444
8.36	0.1758	63574.	43739.	19835.	70.5	7.98	0.3450
8.76	0.1752	63596.	43603.	19992.	70.5	7.98	0.3454
9.16	0.1745	63602.	43461.	20141.	70.7	7.98	0.3460
9.56	0.1738	63608.	43333.	20275.	70.8	7.98	0.3466
9.96	0.1732	63602.	43206.	20396.	70.9	7.99	0.3471

DELTAT = 0.50, PRINTING EVERY 10 STEPS

14.96	0.1684	63593.	42190.	21403.	71.6	7.99	0.3508
19.96	0.1645	63577.	41558.	22019.	72.3	7.99	0.3539
24.96	0.1620	63564.	41158.	22406.	72.7	7.98	0.3558
29.96	0.1604	63572.	40869.	22702.	72.9	7.98	0.3570
34.96	0.1582	63552.	40673.	22879.	73.3	7.99	0.3587
39.96	0.1567	63546.	40511.	23035.	73.5	7.99	0.3598
44.96	0.1554	63540.	40380.	23159.	73.7	7.98	0.3608
49.96	0.1543	63543.	40285.	23257.	73.9	7.98	0.3616
54.96	0.1530	63546.	40203.	23343.	74.1	7.99	0.3626
59.96	0.1521	63537.	40127.	23410.	74.2	7.98	0.3633
64.96	0.1513	63549.	40073.	23476.	74.3	7.98	0.3639
69.96	0.1505	63549.	40022.	23527.	74.4	7.98	0.3645
74.96	0.1498	63558.	39984.	23574.	74.6	7.98	0.3651
79.96	0.1493	63555.	39946.	23609.	74.6	7.98	0.3654
84.96	0.1488	63564.	39914.	23651.	74.7	7.99	0.3658
89.96	0.1478	63562.	39892.	23670.	74.8	7.99	0.3665
94.96	0.1474	63574.	39870.	23704.	74.9	8.00	0.3669
99.96	0.1471	63577.	39854.	23723.	75.0	7.99	0.3671
104.96	0.1467	63577.	39831.	23745.	75.0	7.99	0.3673
109.96	0.1464	63586.	39822.	23764.	75.1	7.99	0.3676
114.96	0.1458	63592.	39809.	23783.	75.2	7.99	0.3680
119.96	0.1458	63595.	39793.	23802.	75.2	8.00	0.3680
124.96	0.1452	63602.	39784.	23818.	75.3	7.99	0.3685
129.96	0.1446	63608.	39784.	23824.	75.3	7.99	0.3689
134.96	0.1440	63611.	39777.	23834.	75.4	8.00	0.3693

M3070.010



RHEOLOGY DATA FOR FILE
M3870.011

INITIAL HEIGHT OF BED 281.7 MM
MASS OF PROPELLANT 0.8763 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTA T = 0.04. PRINTING EVERY STEP

0.00	0.4523	123.	153.	-31.	0.0	7.90	0.0300
0.04	0.4523	126.	153.	-27.	0.0	7.90	0.0001
0.08	0.4524	126.	153.	-27.	-0.0	7.90	-0.0001
0.12	0.4523	129.	160.	-31.	0.0	7.03	0.0001
0.16	0.4507	711.	518.	192.	0.6	5.34	0.0330
0.20	0.4425	2771.	2043.	728.	3.6	5.70	0.0176
0.24	0.4306	6162.	4682.	1480.	7.7	5.82	0.0382
0.28	0.4175	10193.	7861.	2332.	12.1	5.94	0.0598
0.32	0.4038	14277.	11097.	3180.	16.4	6.05	0.0814
0.36	0.3904	18463.	14415.	4048.	20.5	6.16	0.1017
0.40	0.3770	22487.	17594.	4894.	24.4	6.28	0.1209
0.44	0.3641	26481.	20753.	5728.	28.0	6.39	0.1388
0.48	0.3516	30219.	23690.	6529.	31.3	6.50	0.1553
0.52	0.3394	33657.	26411.	7245.	34.5	6.61	0.1710
0.56	0.3279	36842.	28967.	7875.	37.3	6.70	0.1851
0.60	0.3170	39875.	31476.	8399.	40.0	6.80	0.1981
0.64	0.3067	42756.	33861.	8895.	42.4	6.89	0.2101
0.68	0.2970	45373.	36062.	9311.	44.6	6.98	0.2209
0.72	0.2880	47837.	38135.	9702.	46.6	7.06	0.2308
0.76	0.2797	50028.	40009.	10020.	48.3	7.14	0.2397
0.80	0.2721	52008.	41688.	10320.	49.9	7.22	0.2476
0.84	0.2655	53708.	43117.	10591.	51.3	7.29	0.2544
0.88	0.2597	55109.	44292.	10817.	52.5	7.35	0.2602
0.92	0.2540	56262.	45251.	11011.	53.6	7.41	0.2659
0.96	0.2493	57182.	46022.	11160.	54.5	7.46	0.2704
1.00	0.2451	57918.	46625.	11293.	55.4	7.49	0.2745
1.04	0.2413	58503.	47080.	11423.	56.1	7.52	0.2782
1.08	0.2382	58972.	47416.	11555.	56.7	7.55	0.2811
1.12	0.2349	59354.	47683.	11671.	57.3	7.58	0.2842

PRINTING EVERY 10 STEPS

1.16	0.2324	59658.	47870.	11788.	57.8	7.60	0.2865
1.56	0.2157	61054.	48372.	12682.	60.8	7.70	0.3017
1.96	0.2069	61498.	48057.	13441.	62.4	7.74	0.3094
2.36	0.2010	61768.	47670.	14098.	63.4	7.77	0.3146
2.76	0.1968	61977.	47270.	14707.	64.2	7.79	0.3182
3.16	0.1932	62145.	46886.	15259.	64.8	7.80	0.3212
3.56	0.1907	62269.	46530.	15739.	65.2	7.82	0.3233

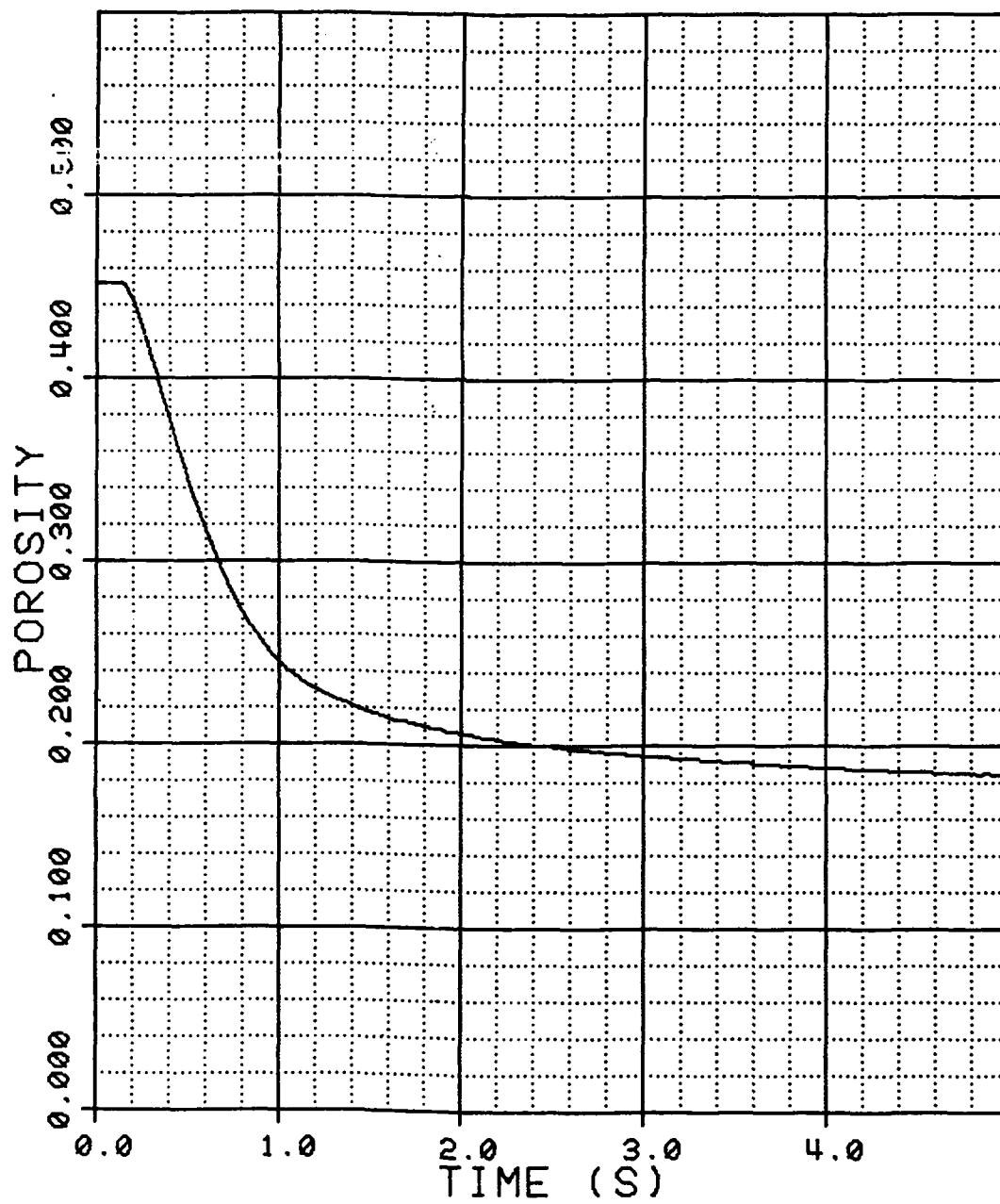
RHEOLOGY DATA FOR FILE
M3070.011

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.1883	62393.	46216.	16177.	65.6	7.84	0.3253
4.36	0.1863	62452.	45911.	16541.	65.9	7.85	0.3269
4.76	0.1847	62511.	45632.	16880.	66.2	7.85	0.3283
5.16	0.1831	62564.	45390.	17174.	66.5	7.85	0.3296
5.56	0.1818	62620.	45168.	17452.	66.7	7.86	0.3306
5.96	0.1805	62670.	44977.	17693.	66.9	7.87	0.3317
6.36	0.1795	62654.	44771.	17884.	67.1	7.87	0.3326
6.76	0.1785	62676.	44596.	18080.	67.2	7.87	0.3334
7.16	0.1776	62707.	44444.	18263.	67.4	7.87	0.3341
7.56	0.1767	62720.	44291.	18428.	67.5	7.88	0.3348
7.96	0.1757	62729.	44158.	18571.	67.7	7.88	0.3356
8.36	0.1751	62732.	44025.	18707.	67.8	7.88	0.3361
8.76	0.1745	62747.	43904.	18844.	67.9	7.88	0.3365
9.16	0.1737	62747.	43796.	18952.	68.0	7.88	0.3372
9.56	0.1733	62775.	43707.	19068.	68.1	7.89	0.3376
9.96	0.1725	62785.	43602.	19182.	68.2	7.89	0.3382

DELTAT = 0.50. PRINTING EVERY 10 STEPS

14.96	0.1674	62800.	42805.	19995.	69.0	7.89	0.3422
19.96	0.1637	62834.	42288.	20546.	69.6	7.89	0.3451
24.96	0.1607	62847.	41951.	20895.	70.1	7.91	0.3474
29.96	0.1583	62865.	41703.	21162.	70.4	7.91	0.3493
34.96	0.1567	62868.	41513.	21356.	70.7	7.91	0.3506
39.96	0.1551	62881.	41360.	21520.	70.9	7.91	0.3518
44.96	0.1538	62899.	41240.	21660.	71.1	7.91	0.3528
49.96	0.1526	62918.	41141.	21777.	71.3	7.92	0.3537
54.96	0.1521	62912.	41043.	21869.	71.4	7.92	0.3541
59.96	0.1509	62930.	40979.	21951.	71.6	7.92	0.3550
64.96	0.1498	62955.	40929.	22027.	71.8	7.93	0.3558
69.96	0.1491	62955.	40865.	22090.	71.9	7.93	0.3563
74.96	0.1488	62977.	40821.	22156.	71.9	7.93	0.3566
79.96	0.1479	62971.	40776.	22194.	72.0	7.93	0.3573
84.96	0.1473	63002.	40745.	22257.	72.1	7.94	0.3577
89.96	0.1468	62996.	40706.	22290.	72.2	7.94	0.3581
94.96	0.1462	63017.	40684.	22333.	72.3	7.94	0.3586
99.96	0.1457	63027.	40652.	22375.	72.4	7.94	0.3589
104.96	0.1453	63024.	40636.	22387.	72.4	7.94	0.3592
109.96	0.1449	63049.	40611.	22437.	72.5	7.94	0.3595
114.96	0.1443	63052.	40595.	22457.	72.6	7.95	0.3599
119.96	0.1441	63061.	40582.	22478.	72.6	7.95	0.3602
124.96	0.1437	63076.	40567.	22510.	72.7	7.95	0.3605
129.96	0.1434	63089.	40560.	22529.	72.7	7.96	0.3607
134.96	0.1429	63092.	40545.	22548.	72.8	7.96	0.3610

M3070.011



RHEOLOGY DATA FOR FILE
M3070.011

INITIAL HEIGHT OF BED 201.7 MM
MASS OF PROPELLANT 0.0763 KG

TIME S	POROSITY -	AVERAGE UPPER FORCE N	AVERAGE LOWER FORCE N	RESISTIVE FORCE N	AVERAGE DISTANCE MOVED MM	OIL PRESSURE MPA	STRAIN -
DELTA T = 0.04, PRINTING EVERY STEP							
0.00	0.4523	123.	153.	-31.	0.0	7.90	0.0000
0.04	0.4523	126.	153.	-27.	0.0	7.90	0.0001
0.08	0.4524	126.	153.	-27.	-0.0	7.90	-0.0001
0.12	0.4523	129.	160.	-31.	0.0	7.03	0.0001
0.16	0.4507	711.	510.	192.	0.6	5.34	0.0030
0.20	0.4425	2771.	2043.	728.	3.6	5.70	0.0176
0.24	0.4306	6162.	4682.	1480.	7.7	5.82	0.0382
0.28	0.4175	10193.	7861.	2332.	12.1	5.94	0.0598
0.32	0.4038	14277.	11097.	3180.	16.4	6.05	0.0814
0.36	0.3904	18463.	14415.	4048.	20.5	6.16	0.1017
0.40	0.3770	22487.	17594.	4894.	24.4	6.28	0.1209
0.44	0.3641	26481.	20753.	5728.	28.0	6.39	0.1388
0.48	0.3516	30219.	23690.	6529.	31.3	6.50	0.1553
0.52	0.3394	33657.	26411.	7245.	34.5	6.61	0.1710
0.56	0.3279	36842.	28967.	7875.	37.3	6.70	0.1851
0.60	0.3170	39875.	31476.	8399.	40.0	6.80	0.1981
0.64	0.3067	42756.	33861.	8895.	42.4	6.89	0.2101
0.68	0.2970	45373.	36062.	9311.	44.6	6.98	0.2209
0.72	0.2880	47837.	38135.	9702.	46.6	7.06	0.2308
0.76	0.2797	50020.	40009.	10020.	48.3	7.14	0.2397
0.80	0.2721	52000.	41688.	10320.	49.9	7.22	0.2476
0.84	0.2655	53700.	43117.	10591.	51.3	7.29	0.2544
0.88	0.2597	55109.	44292.	10817.	52.5	7.35	0.2582
0.92	0.2540	56262.	45251.	11011.	53.6	7.41	0.2659
0.96	0.2493	57182.	46022.	11160.	54.5	7.46	0.2704
1.00	0.2451	57910.	46625.	11293.	55.4	7.49	0.2745
1.04	0.2413	58503.	47000.	11423.	56.1	7.52	0.2782
1.08	0.2382	58972.	47416.	11555.	56.7	7.55	0.2811
1.12	0.2349	59354.	47603.	11671.	57.3	7.58	0.2842

PRINTING EVERY 10 STEPS

1.16	0.2324	59650.	47870.	11788.	57.8	7.60	0.2865
1.56	0.2157	61054.	48372.	12682.	60.8	7.70	0.3017
1.96	0.2069	61490.	48057.	13441.	62.4	7.74	0.3094
2.36	0.2010	61760.	47670.	14098.	63.4	7.77	0.3146
2.76	0.1968	61977.	47270.	14707.	64.2	7.79	0.3182
3.16	0.1932	62145.	46886.	15259.	64.8	7.80	0.3212
3.56	0.1907	62269.	46530.	15739.	65.2	7.82	0.3233

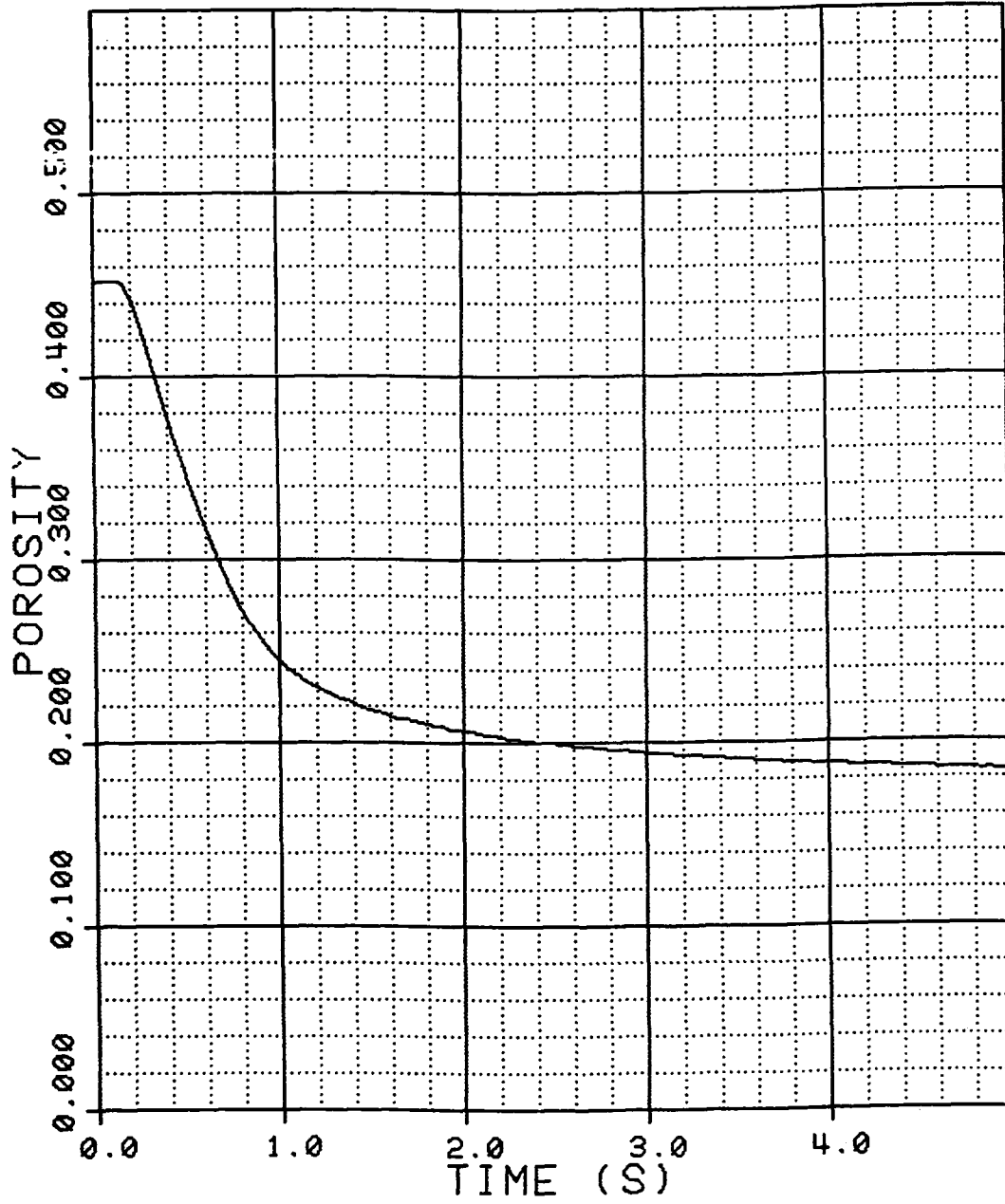
RHEOLOGY DATA FOR FILE
M3070.011

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.1883	62393.	46216.	16177.	65.6	7.84	0.3253
4.36	0.1863	62452.	45911.	16541.	65.9	7.85	0.3269
4.76	0.1847	62511.	45632.	16880.	66.2	7.85	0.3283
5.16	0.1831	62564.	45390.	17174.	66.5	7.85	0.3296
5.56	0.1815	62620.	45168.	17452.	66.7	7.86	0.3306
5.96	0.1805	62670.	44977.	17693.	66.9	7.87	0.3317
6.36	0.1795	62654.	44771.	17884.	67.1	7.87	0.3326
6.76	0.1785	62676.	44596.	18080.	67.2	7.87	0.3334
7.16	0.1776	62707.	44444.	18263.	67.4	7.87	0.3341
7.56	0.1767	62720.	44291.	18428.	67.5	7.88	0.3348
7.96	0.1757	62729.	44158.	18571.	67.7	7.88	0.3356
8.36	0.1751	62732.	44025.	18707.	67.8	7.88	0.3361
8.76	0.1745	62747.	43904.	18844.	67.9	7.88	0.3365
9.16	0.1737	62747.	43796.	18952.	68.0	7.88	0.3372
9.56	0.1733	62775.	43707.	19068.	68.1	7.89	0.3376
9.96	0.1725	62785.	43602.	19182.	68.2	7.89	0.3382

DELTA T = 0.50. PRINTING EVERY 10 STEPS

14.96	0.1674	62800.	42805.	19995.	69.0	7.89	0.3422
19.96	0.1637	62834.	42288.	20546.	69.6	7.89	0.3451
24.96	0.1607	62847.	41951.	20895.	70.1	7.91	0.3474
29.96	0.1583	62865.	41703.	21162.	70.4	7.91	0.3493
34.96	0.1567	62868.	41513.	21356.	70.7	7.91	0.3506
39.96	0.1551	62881.	41360.	21520.	70.9	7.91	0.3518
44.96	0.1538	62899.	41240.	21660.	71.1	7.91	0.3528
49.96	0.1526	62918.	41141.	21777.	71.3	7.92	0.3537
54.96	0.1521	62912.	41043.	21869.	71.4	7.92	0.3541
59.96	0.1509	62930.	40979.	21951.	71.6	7.92	0.3550
64.96	0.1498	62955.	40929.	22027.	71.8	7.93	0.3558
69.96	0.1491	62955.	40865.	22090.	71.9	7.93	0.3563
74.96	0.1488	62977.	40821.	22156.	71.9	7.93	0.3566
79.96	0.1479	62971.	40776.	22194.	72.0	7.93	0.3573
84.96	0.1473	63002.	40745.	22257.	72.1	7.94	0.3577
89.96	0.1468	62996.	40706.	22290.	72.2	7.94	0.3581
94.96	0.1462	63017.	40684.	22333.	72.3	7.94	0.3586
99.96	0.1457	63027.	40652.	22375.	72.4	7.94	0.3589
104.96	0.1453	63024.	40636.	22387.	72.4	7.94	0.3592
109.96	0.1449	63049.	40611.	22437.	72.5	7.94	0.3595
114.96	0.1443	63052.	40595.	22457.	72.6	7.95	0.3599
119.96	0.1441	63061.	40582.	22478.	72.6	7.95	0.3602
124.96	0.1437	63076.	40567.	22510.	72.7	7.95	0.3605
129.96	0.1434	63089.	40560.	22529.	72.7	7.96	0.3607
134.96	0.1429	63092.	40545.	22548.	72.8	7.96	0.3610

M3070.011



RHEOLOGY DATA FOR FILE
M3070.012

INITIAL HEIGHT OF BED 197.8 MM
MASS OF PROPELLANT 0.0744 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTA T = 0.04, PRINTING EVERY STEP

0.00	0.4429	123.	161.	-38.	0.0	2.62	0.0000
0.04	0.4429	120.	168.	-48.	0.0	2.62	0.0001
0.08	0.4430	120.	165.	-45.	-0.0	2.62	-0.0001
0.12	0.4429	132.	174.	-42.	0.0	1.49	0.0000
0.16	0.4421	589.	444.	145.	0.3	1.76	0.0015
0.20	0.4384	1460.	1064.	396.	1.6	1.87	0.0080
0.24	0.4338	2622.	1910.	704.	3.2	1.91	0.0162
0.28	0.4280	4080.	3052.	1028.	5.2	1.95	0.0261
0.32	0.4220	5696.	4303.	1393.	7.2	2.00	0.0362
0.36	0.4165	7471.	5685.	1786.	9.0	2.05	0.0454
0.40	0.4105	9192.	7037.	2155.	10.9	2.11	0.0551
0.44	0.4052	10715.	8238.	2477.	12.6	2.16	0.0635
0.48	0.4002	12173.	9368.	2805.	14.1	2.21	0.0713
0.52	0.3957	13481.	10397.	3084.	15.5	2.25	0.0781
0.56	0.3918	14600.	11207.	3313.	16.6	2.29	0.0841
0.60	0.3877	15576.	12058.	3517.	17.8	2.33	0.0902
0.64	0.3845	16415.	12728.	3687.	18.8	2.36	0.0950
0.68	0.3814	17098.	13268.	3831.	19.7	2.39	0.0994
0.72	0.3790	17661.	13700.	3962.	20.4	2.42	0.1030
0.76	0.3764	18136.	14069.	4068.	21.1	2.44	0.1067
0.80	0.3741	18538.	14364.	4174.	21.8	2.46	0.1100
0.84	0.3723	18851.	14599.	4253.	22.3	2.47	0.1126
0.88	0.3705	19106.	14789.	4317.	22.8	2.49	0.1151
0.92	0.3689	19318.	14932.	4385.	23.2	2.50	0.1173
0.96	0.3676	19482.	15037.	4445.	23.6	2.51	0.1191
1.00	0.3664	19631.	15132.	4499.	23.9	2.52	0.1208
1.04	0.3653	19750.	15192.	4557.	24.2	2.52	0.1223
1.08	0.3643	19840.	15243.	4597.	24.5	2.53	0.1237
1.12	0.3632	19924.	15285.	4639.	24.8	2.53	0.1252

PRINTING EVERY 10 STEPS

1.16	0.3625	19986.	15313.	4672.	25.0	2.54	0.1262
1.56	0.3562	20353.	15272.	5081.	26.6	2.56	0.1347
1.96	0.3526	20399.	15040.	5359.	27.6	2.58	0.1396
2.36	0.3500	20465.	14811.	5653.	28.3	2.59	0.1430
2.76	0.3477	20498.	14605.	5893.	28.9	2.60	0.1460
3.16	0.3463	20520.	14418.	6102.	29.3	2.60	0.1479
3.56	0.3450	20551.	14268.	6283.	29.6	2.60	0.1496

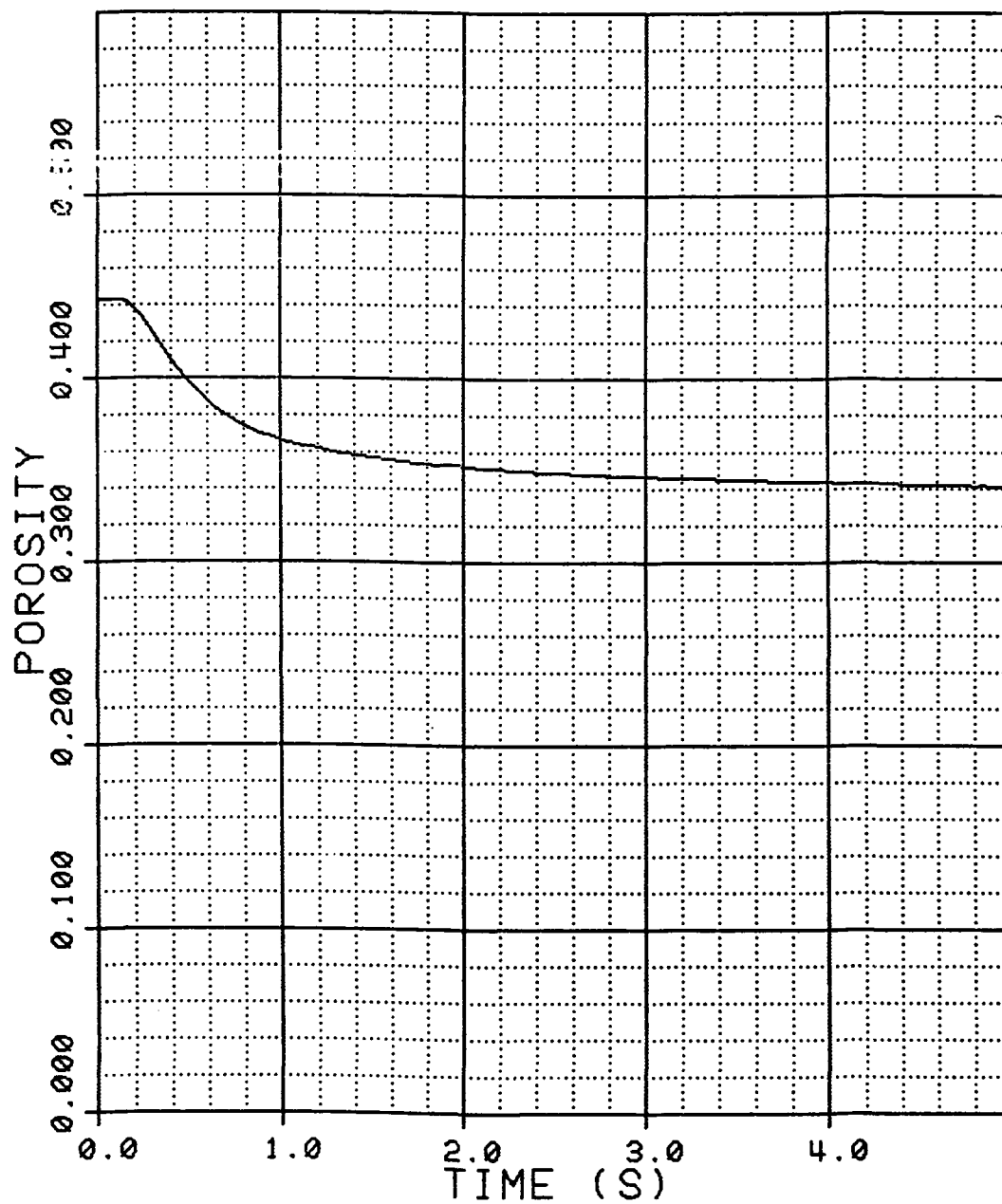
RHEOLOGY DATA FOR FILE
M3070.012

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.3439	20576.	14125.	6451.	29.9	2.60	0.1510
4.36	0.3427	20589.	14008.	6581.	30.2	2.60	0.1525
4.76	0.3417	20607.	13909.	6698.	30.4	2.61	0.1538
5.16	0.3411	20626.	13818.	6808.	30.6	2.61	0.1546
5.56	0.3403	20645.	13732.	6913.	30.8	2.61	0.1556
5.96	0.3396	20648.	13662.	6986.	30.9	2.61	0.1564
6.36	0.3390	20657.	13595.	7062.	31.1	2.61	0.1572
6.76	0.3384	20666.	13538.	7128.	31.3	2.62	0.1580
7.16	0.3379	20679.	13484.	7196.	31.4	2.61	0.1586
7.56	0.3374	20675.	13439.	7236.	31.5	2.61	0.1593
7.96	0.3368	20691.	13389.	7303.	31.7	2.61	0.1600
8.36	0.3365	20697.	13347.	7350.	31.7	2.62	0.1604
8.76	0.3356	20691.	13313.	7378.	32.0	2.63	0.1615
9.16	0.3357	20710.	13274.	7436.	31.9	2.62	0.1614
9.56	0.3351	20713.	13242.	7471.	32.1	2.62	0.1623
9.96	0.3348	20713.	13214.	7499.	32.2	2.62	0.1626

DELTAT = 0.50, PRINTING EVERY 10 STEPS

14.96	0.3315	20741.	12979.	7762.	33.0	2.63	0.1667
19.96	0.3290	20754.	12823.	7930.	33.6	2.63	0.1698
24.96	0.3269	20766.	12731.	8035.	34.1	2.63	0.1724
29.96	0.3254	20756.	12661.	8095.	34.5	2.63	0.1743
34.96	0.3241	20741.	12607.	8134.	34.8	2.63	0.1758
39.96	0.3229	20738.	12557.	8181.	35.1	2.63	0.1773
44.96	0.3220	20741.	12519.	8222.	35.3	2.63	0.1784
49.96	0.3213	20748.	12486.	8261.	35.4	2.62	0.1792
54.96	0.3205	20760.	12464.	8296.	35.7	2.62	0.1802
59.96	0.3197	20756.	12448.	8308.	35.8	2.63	0.1812
64.96	0.3191	20756.	12433.	8323.	36.0	2.62	0.1819
69.96	0.3185	20762.	12420.	8342.	36.1	2.63	0.1827
74.96	0.3180	20769.	12397.	8372.	36.3	2.63	0.1832
79.96	0.3175	20766.	12385.	8381.	36.4	2.63	0.1838
84.96	0.3170	20769.	12379.	8390.	36.5	2.63	0.1844
89.96	0.3165	20779.	12366.	8413.	36.6	2.63	0.1850
94.96	0.3161	20781.	12357.	8425.	36.7	2.63	0.1855
99.96	0.3156	20785.	12350.	8434.	36.8	2.63	0.1860
104.96	0.3155	20791.	12340.	8450.	36.8	2.63	0.1862
109.96	0.3151	20791.	12334.	8457.	36.9	2.63	0.1867
114.96	0.3149	20794.	12331.	8463.	37.0	2.63	0.1869
119.96	0.3144	20797.	12325.	8472.	37.1	2.63	0.1875
124.96	0.3142	20794.	12321.	8473.	37.1	2.63	0.1877
129.96	0.3137	20797.	12315.	8482.	37.3	2.63	0.1883
134.96	0.3135	20797.	12312.	8485.	37.3	2.63	0.1886

M3070.012



RHEOLOGY DATA FOR FILE
M3070.013

INITIAL HEIGHT OF BED 199.9 MM
MASS OF PROPELLANT 0.8767 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTAT = 0.04, PRINTING EVERY STEP

0.00	0.4473	136.	181.	-45.	0.0	3.39	0.0300
0.04	0.4473	133.	178.	-45.	-0.0	3.39	-0.0001
0.08	0.4473	136.	175.	-39.	-0.0	3.38	-0.0001
0.12	0.4474	146.	175.	-29.	-0.1	2.01	-0.0003
0.16	0.4458	708.	480.	229.	0.5	2.35	0.0026
0.20	0.4417	1756.	1236.	520.	2.0	2.46	0.0100
0.24	0.4356	3110.	2271.	839.	4.1	2.49	0.0207
0.28	0.4286	4754.	3542.	1213.	6.5	2.54	0.0327
0.32	0.4213	6616.	4974.	1642.	9.0	2.60	0.0448
0.36	0.4139	8506.	6464.	2042.	11.4	2.65	0.0569
0.40	0.4067	10324.	7893.	2431.	13.7	2.70	0.0683
0.44	0.3998	12009.	9210.	2798.	15.8	2.75	0.0790
0.48	0.3932	13556.	10433.	3123.	17.8	2.80	0.0891
0.52	0.3872	15138.	11659.	3479.	19.6	2.85	0.0980
0.56	0.3811	16620.	12825.	3795.	21.4	2.90	0.1069
0.60	0.3758	17870.	13777.	4092.	22.9	2.94	0.1145
0.64	0.3706	18913.	14590.	4323.	24.3	2.97	0.1218
0.68	0.3661	19933.	15362.	4571.	25.6	3.01	0.1281
0.72	0.3617	20853.	16083.	4770.	26.8	3.05	0.1341
0.76	0.3576	21690.	16734.	4955.	27.9	3.08	0.1395
0.80	0.3540	22417.	17306.	5111.	28.9	3.11	0.1444
0.84	0.3507	23026.	17795.	5231.	29.7	3.13	0.1487
0.88	0.3476	23542.	18195.	5347.	30.5	3.16	0.1528
0.92	0.3450	23986.	18564.	5422.	31.2	3.18	0.1561
0.96	0.3425	24353.	18840.	5513.	31.9	3.20	0.1593
1.00	0.3405	24661.	19072.	5589.	32.4	3.21	0.1619
1.04	0.3385	24894.	19259.	5635.	32.9	3.23	0.1644
1.08	0.3370	25089.	19398.	5691.	33.2	3.24	0.1663
1.12	0.3351	25241.	19532.	5710.	33.7	3.26	0.1687

PRINTING EVERY 10 STEPS

1.16	0.3335	25375.	19617.	5758.	34.1	3.26	0.1707
1.56	0.3235	25985.	19894.	6091.	36.6	3.31	0.1829
1.96	0.3178	26199.	19828.	6371.	37.9	3.33	0.1897
2.36	0.3140	26305.	19640.	6665.	38.8	3.33	0.1943
2.76	0.3113	26376.	19437.	6940.	39.5	3.34	0.1975
3.16	0.3087	26429.	19265.	7164.	40.1	3.35	0.2005
3.56	0.3069	26466.	19091.	7375.	40.5	3.35	0.2025

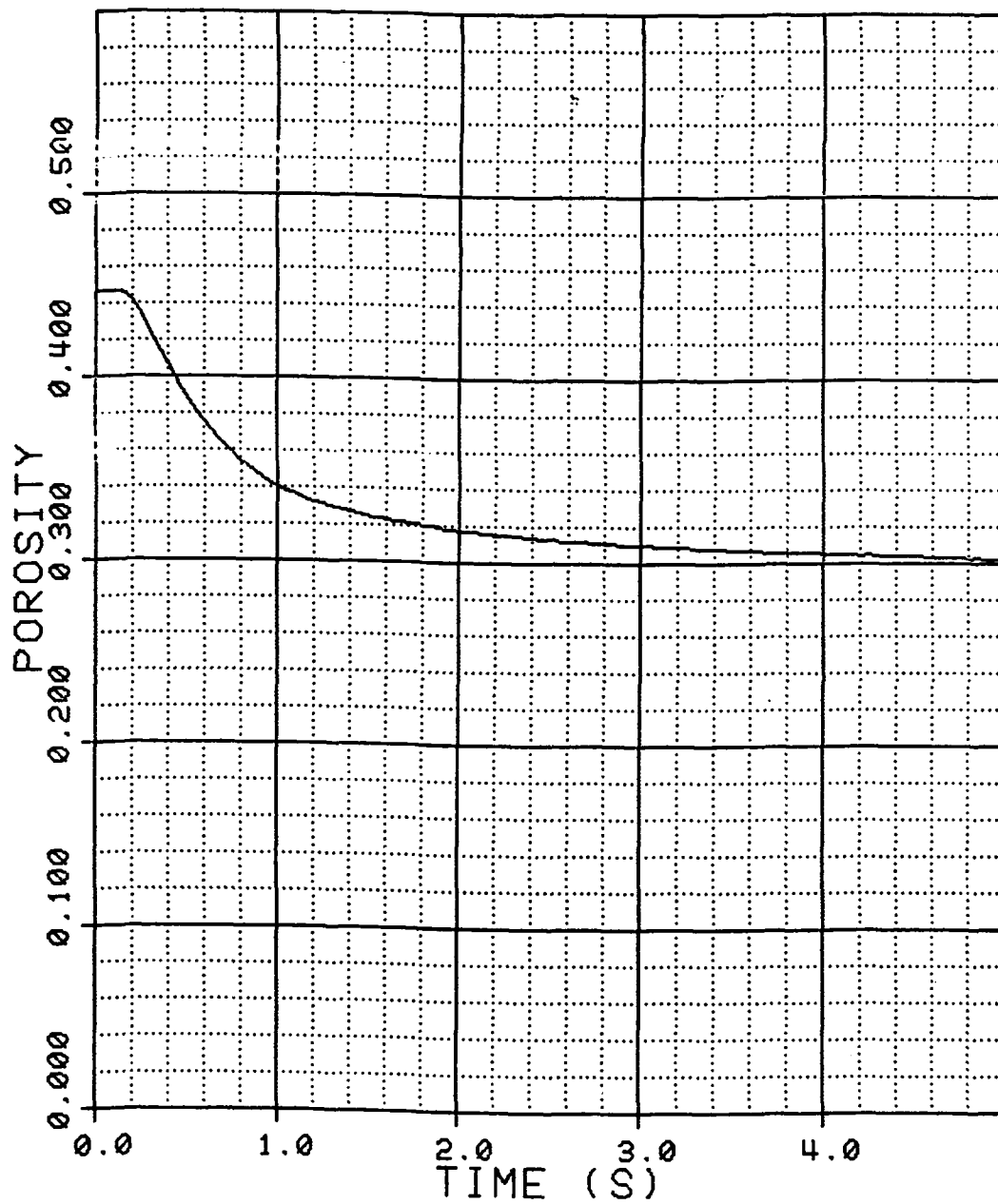
RHEOLOGY DATA FOR FILE
M3070.013

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.3055	26510.	18938.	7572.	40.8	3.36	0.2041
4.36	0.3040	26538.	18805.	7733.	41.1	3.36	0.2059
4.76	0.3026	26568.	18690.	7878.	41.5	3.37	0.2074
5.16	0.3015	26590.	18579.	8012.	41.7	3.37	0.2087
5.56	0.3006	26609.	18490.	8119.	41.9	3.37	0.2097
5.96	0.2996	26637.	18401.	8236.	42.1	3.37	0.2108
6.36	0.2988	26652.	18338.	8314.	42.3	3.38	0.2117
6.76	0.2981	26671.	18271.	8400.	42.5	3.37	0.2125
7.16	0.2974	26681.	18204.	8476.	42.6	3.38	0.2133
7.56	0.2966	26699.	18160.	8539.	42.8	3.38	0.2142
7.96	0.2958	26718.	18116.	8603.	43.0	3.39	0.2151
8.36	0.2954	26724.	18062.	8663.	43.1	3.38	0.2155
8.76	0.2948	26727.	18024.	8703.	43.2	3.38	0.2162
9.16	0.2942	26739.	17989.	8751.	43.3	3.39	0.2169
9.56	0.2937	26743.	17947.	8796.	43.4	3.39	0.2174
9.96	0.2934	26749.	17919.	8830.	43.5	3.39	0.2177

DELTAT = 0.50, PRINTING EVERY 10 STEPS

14.96	0.2890	26795.	17659.	9137.	44.5	3.39	0.2226
19.96	0.2857	26820.	17487.	9333.	45.2	3.39	0.2262
24.96	0.2833	26839.	17366.	9473.	45.7	3.39	0.2288
29.96	0.2814	26845.	17274.	9571.	46.1	3.39	0.2308
34.96	0.2799	26854.	17198.	9657.	46.5	3.39	0.2325
39.96	0.2786	26870.	17131.	9739.	46.7	3.40	0.2338
44.96	0.2777	26867.	17089.	9777.	46.9	3.40	0.2348
49.96	0.2764	26879.	17052.	9827.	47.2	3.40	0.2362
54.96	0.2752	26885.	17020.	9865.	47.4	3.40	0.2373
59.96	0.2734	26898.	17001.	9897.	47.8	3.41	0.2392
64.96	0.2733	26901.	16966.	9935.	47.8	3.41	0.2394
69.96	0.2726	26901.	16937.	9964.	48.0	3.40	0.2401
74.96	0.2720	26895.	16915.	9980.	48.1	3.40	0.2408
79.96	0.2713	26910.	16906.	10005.	48.3	3.40	0.2414
84.96	0.2707	26901.	16889.	10011.	48.4	3.40	0.2421
89.96	0.2703	26910.	16871.	10039.	48.5	3.40	0.2425
94.96	0.2697	26916.	16858.	10059.	48.6	3.42	0.2432
99.96	0.2692	26920.	16848.	10072.	48.7	3.41	0.2437
104.96	0.2687	26916.	16839.	10078.	48.8	3.41	0.2441
109.96	0.2683	26929.	16829.	10099.	48.9	3.42	0.2446
114.96	0.2680	26935.	16816.	10119.	48.9	3.41	0.2448
119.96	0.2675	26929.	16813.	10115.	49.1	3.42	0.2454
124.96	0.2673	26941.	16810.	10131.	49.1	3.41	0.2456
129.96	0.2668	26944.	16804.	10140.	49.2	3.41	0.2461
134.96	0.2668	26947.	16804.	10143.	49.2	3.41	0.2462

M3070.013



RHEOLOGY DATA FOR FILE
M3070.014

INITIAL HEIGHT OF BED 201.4 MM
MASS OF PROPELLANT 0.8767 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTA T = 0.04. PRINTING EVERY STEP

0.00	0.4514	129.	188.	-59.	0.0	2.65	0.0000
0.04	0.4512	125.	194.	-69.	0.1	2.65	0.0004
0.08	0.4514	125.	194.	-69.	0.0	2.65	0.0001
0.12	0.4514	128.	204.	-76.	0.0	1.51	0.0001
0.16	0.4512	246.	235.	11.	0.1	1.80	0.0004
0.20	0.4499	819.	566.	253.	0.6	1.89	0.0027
0.24	0.4468	1593.	1144.	449.	1.7	1.91	0.0084
0.28	0.4423	2634.	1932.	702.	3.3	1.94	0.0164
0.32	0.4376	3914.	2939.	976.	4.9	1.97	0.0245
0.36	0.4319	5356.	4082.	1274.	6.9	2.02	0.0343
0.40	0.4263	6845.	5254.	1591.	8.8	2.07	0.0437
0.44	0.4207	8272.	6356.	1916.	10.7	2.11	0.0530
0.48	0.4151	9608.	7407.	2201.	12.5	2.15	0.0621
0.52	0.4101	10895.	8407.	2488.	14.1	2.20	0.0700
0.56	0.4050	12082.	9328.	2754.	15.7	2.23	0.0780
0.60	0.4006	13198.	10198.	2999.	17.1	2.26	0.0848
0.64	0.3961	14205.	10995.	3209.	18.4	2.30	0.0916
0.68	0.3920	15093.	11698.	3395.	19.7	2.33	0.0977
0.72	0.3885	15886.	12329.	3557.	20.7	2.36	0.1028
0.76	0.3849	16566.	12882.	3684.	21.8	2.39	0.1082
0.80	0.3820	17138.	13342.	3796.	22.6	2.42	0.1123
0.84	0.3791	17648.	13746.	3903.	23.4	2.44	0.1164
0.88	0.3764	18077.	14105.	3972.	24.2	2.46	0.1202
0.92	0.3742	18444.	14388.	4056.	24.8	2.47	0.1233
0.96	0.3720	18754.	14619.	4135.	25.5	2.49	0.1265
1.00	0.3702	19019.	14835.	4183.	26.0	2.50	0.1290
1.04	0.3682	19248.	15007.	4242.	26.5	2.51	0.1317
1.08	0.3666	19442.	15140.	4301.	27.0	2.52	0.1338
1.12	0.3652	19587.	15251.	4336.	27.3	2.53	0.1358

PRINTING EVERY 10 STEPS

1.16	0.3638	19706.	15327.	4378.	27.7	2.53	0.1377
1.56	0.3543	20293.	15626.	4668.	30.3	2.58	0.1504
1.96	0.3487	20430.	15527.	4903.	31.7	2.60	0.1576
2.36	0.3451	20517.	15394.	5123.	32.7	2.61	0.1623
2.76	0.3424	20579.	15251.	5328.	33.4	2.62	0.1658
3.16	0.3401	20626.	15112.	5514.	34.0	2.62	0.1686
3.56	0.3384	20657.	14990.	5666.	34.4	2.62	0.1708

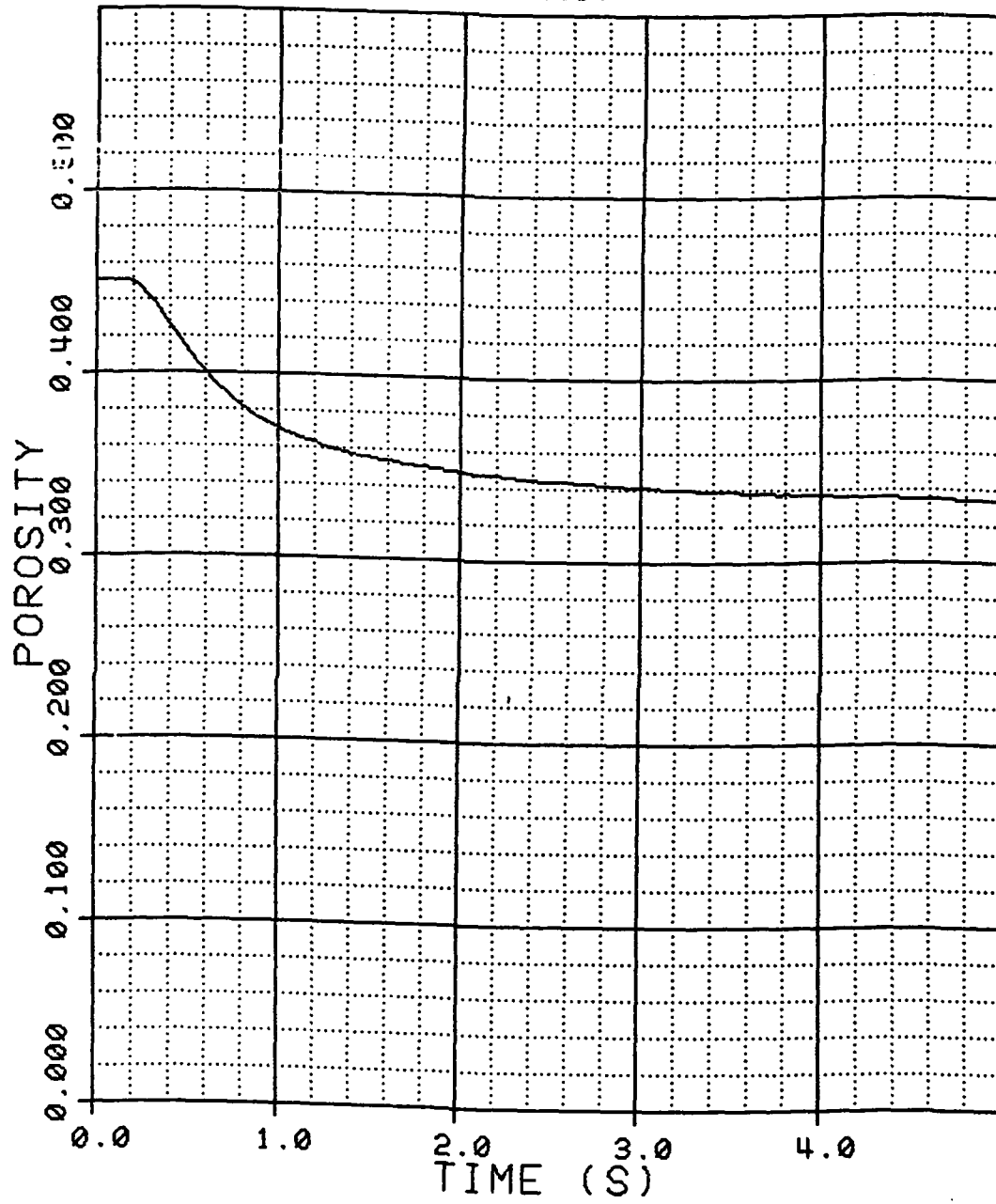
RHEOLOGY DATA FOR FILE
M3070.014

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	--
3.96	0.3368	20685.	14882.	5802.	34.8	2.62	0.1727
4.36	0.3355	20706.	14797.	5909.	35.1	2.63	0.1744
4.76	0.3343	20734.	14715.	6020.	35.4	2.64	0.1759
5.16	0.3333	20734.	14635.	6099.	35.7	2.64	0.1772
5.56	0.3323	20762.	14575.	6187.	35.9	2.63	0.1783
5.96	0.3318	20791.	14511.	6280.	36.1	2.63	0.1790
6.36	0.3306	20793.	14483.	6310.	36.3	2.64	0.1804
6.76	0.3299	20831.	14445.	6386.	36.5	2.64	0.1814
7.16	0.3293	20846.	14413.	6433.	36.7	2.64	0.1820
7.56	0.3285	20855.	14374.	6481.	36.9	2.64	0.1830
7.96	0.3280	20859.	14340.	6519.	37.0	2.64	0.1836
8.36	0.3274	20865.	14298.	6567.	37.1	2.64	0.1843
8.76	0.3270	20858.	14279.	6579.	37.2	2.64	0.1849
9.16	0.3264	20874.	14257.	6617.	37.4	2.65	0.1856
9.56	0.3259	20881.	14225.	6656.	37.5	2.64	0.1861
9.96	0.3256	20896.	14213.	6684.	37.6	2.64	0.1866

DELTA T = 0.50. PRINTING EVERY 10 STEPS

14.96	0.3214	20918.	14029.	6889.	38.6	2.64	0.1916
19.96	0.3183	20939.	13904.	7035.	39.3	2.65	0.1952
24.96	0.3164	20948.	13819.	7130.	39.8	2.65	0.1975
29.96	0.3144	20958.	13758.	7200.	40.2	2.65	0.1998
34.96	0.3131	20967.	13711.	7257.	40.6	2.66	0.2014
39.96	0.3117	20977.	13679.	7298.	40.9	2.65	0.2029
44.96	0.3104	20964.	13648.	7316.	41.2	2.66	0.2045
49.96	0.3094	20970.	13619.	7351.	41.4	2.65	0.2057
54.96	0.3087	20973.	13594.	7380.	41.6	2.65	0.2065
59.96	0.3079	20980.	13575.	7405.	41.8	2.65	0.2073
64.96	0.3072	20989.	13555.	7434.	41.9	2.65	0.2082
69.96	0.3063	20986.	13543.	7444.	42.1	2.65	0.2091
74.96	0.3059	20999.	13530.	7469.	42.2	2.65	0.2096
79.96	0.3053	20995.	13527.	7468.	42.4	2.65	0.2103
84.96	0.3049	20998.	13515.	7484.	42.5	2.65	0.2108
89.96	0.3044	21005.	13501.	7503.	42.6	2.66	0.2113
94.96	0.3040	21001.	13498.	7503.	42.6	2.65	0.2117
99.96	0.3035	21005.	13492.	7513.	42.8	2.65	0.2124
104.96	0.3028	21011.	13492.	7519.	42.9	2.65	0.2131
109.96	0.3026	21010.	13479.	7531.	43.0	2.65	0.2134
114.96	0.3019	21024.	13482.	7542.	43.1	2.65	0.2141
119.96	0.3018	21020.	13479.	7541.	43.2	2.65	0.2143
124.96	0.3013	21030.	13466.	7564.	43.3	2.65	0.2148
129.96	0.3010	21023.	13473.	7550.	43.3	2.65	0.2151
134.96	0.3008	21030.	13463.	7567.	43.4	2.66	0.2154

M3070.014



RHEOLOGY DATA FOR FILE
M3070.015

INITIAL HEIGHT OF BED 203.4 MM
MASS OF PROPELLANT 0.8760 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTAT = 0.04. PRINTING EVERY STEP

0.00	0.4571	81.	143.	-62.	0.0	2.64	0.0300
0.04	0.4570	82.	136.	-55.	0.0	2.63	0.0001
0.08	0.4570	88.	143.	-55.	0.0	2.63	0.0001
0.12	0.4571	88.	140.	-52.	-0.0	1.49	-0.0000
0.16	0.4569	212.	194.	18.	0.1	1.79	0.0004
0.20	0.4559	629.	425.	204.	0.5	1.87	0.0023
0.24	0.4533	1169.	797.	372.	1.4	1.88	0.0069
0.28	0.4502	1941.	1350.	590.	2.6	1.91	0.0125
0.32	0.4463	2957.	2112.	845.	4.0	1.94	0.0196
0.36	0.4416	4197.	3020.	1177.	5.6	1.97	0.0277
0.40	0.4367	5589.	4078.	1511.	7.4	2.02	0.0363
0.44	0.4312	7038.	5181.	1857.	9.3	2.06	0.0456
0.48	0.4258	8396.	6203.	2193.	11.1	2.10	0.0546
0.52	0.4206	9776.	7261.	2515.	12.8	2.15	0.0631
0.56	0.4155	11106.	8264.	2842.	14.5	2.19	0.0712
0.60	0.4108	12314.	9207.	3107.	16.0	2.23	0.0785
0.64	0.4064	13437.	10065.	3372.	17.4	2.26	0.0855
0.68	0.4024	14401.	10833.	3568.	18.6	2.29	0.0915
0.72	0.3985	15233.	11500.	3733.	19.8	2.32	0.0975
0.76	0.3950	15961.	12062.	3899.	20.9	2.35	0.1027
0.80	0.3920	16591.	12558.	4034.	21.8	2.37	0.1071
0.84	0.3886	17151.	12999.	4152.	22.8	2.40	0.1120
0.88	0.3860	17627.	13377.	4250.	23.6	2.42	0.1159
0.92	0.3835	18052.	13710.	4342.	24.3	2.44	0.1195
0.96	0.3812	18429.	14006.	4423.	24.9	2.46	0.1227
1.00	0.3793	18739.	14260.	4479.	25.5	2.47	0.1254
1.04	0.3773	19019.	14460.	4559.	26.1	2.49	0.1281
1.08	0.3757	19252.	14625.	4620.	26.5	2.50	0.1304
1.12	0.3741	19432.	14765.	4660.	27.0	2.50	0.1326

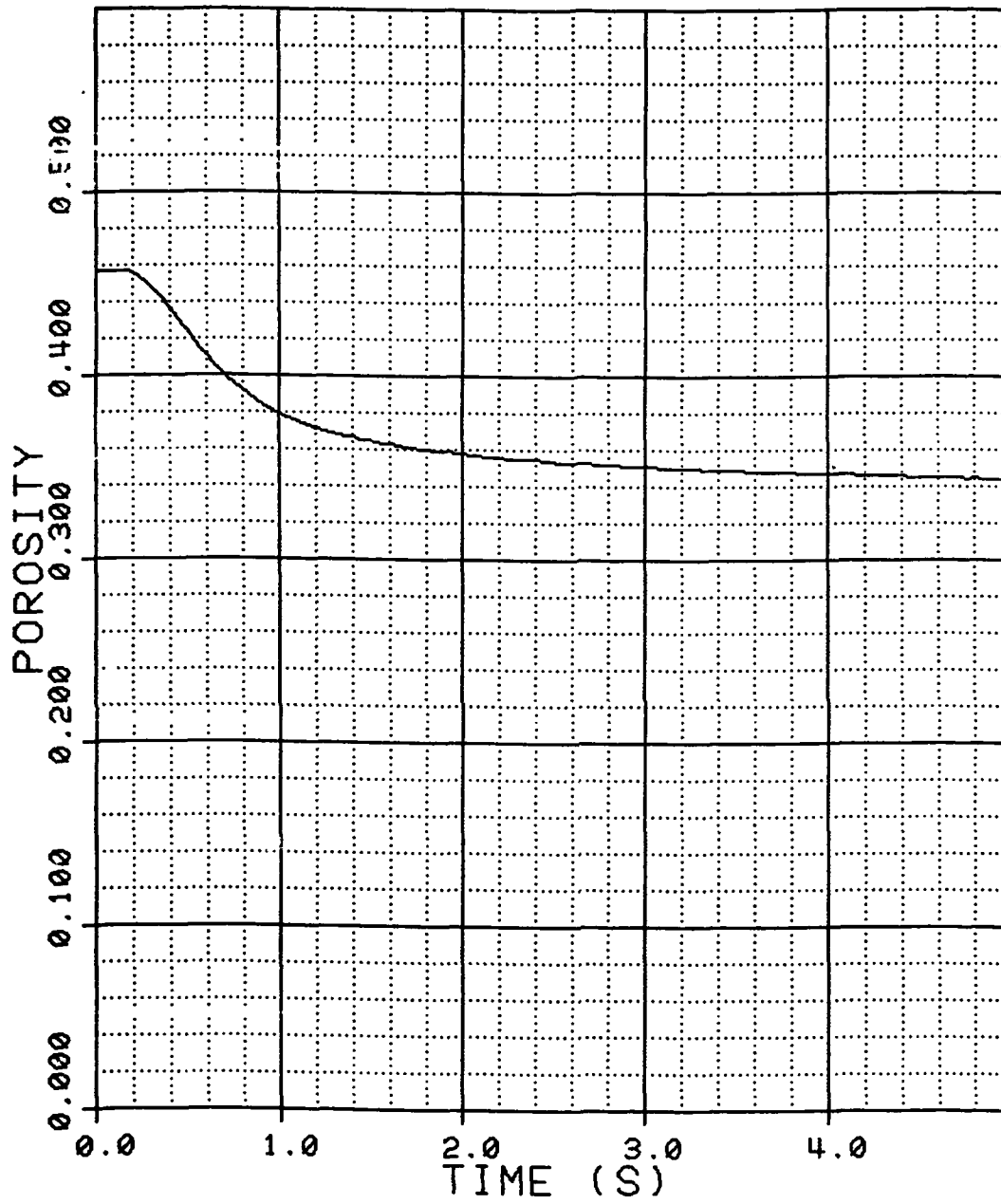
PRINTING EVERY 10 STEPS

1.16	0.3725	19591.	14873.	4718.	27.4	2.51	0.1348
1.56	0.3632	20265.	15188.	5077.	30.0	2.57	0.1475
1.96	0.3581	20408.	15022.	5387.	31.4	2.58	0.1543
2.36	0.3546	20461.	14841.	5620.	32.3	2.59	0.1588
2.76	0.3521	20508.	14657.	5851.	33.0	2.59	0.1621
3.16	0.3500	20548.	14523.	6024.	33.5	2.60	0.1648
3.56	0.3484	20585.	14390.	6196.	33.9	2.61	0.1668

RHEOLOGY DATA FOR FILE
M3070.015

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.3470	20607.	14275.	6332.	34.3	2.61	0.1686
4.36	0.3456	20629.	14174.	6455.	34.7	2.61	0.1704
4.76	0.3445	20666.	14104.	6562.	34.9	2.61	0.1718
5.16	0.3435	20694.	14040.	6654.	35.2	2.61	0.1730
5.56	0.3427	20707.	13974.	6733.	35.4	2.61	0.1741
5.96	0.3419	20712.	13920.	6793.	35.6	2.62	0.1751
6.36	0.3409	20731.	13869.	6863.	35.0	2.63	0.1763
6.76	0.3405	20741.	13818.	6923.	36.0	2.62	0.1768
7.16	0.3398	20728.	13774.	6954.	36.1	2.62	0.1777
7.56	0.3391	20747.	13745.	7002.	36.3	2.63	0.1786
7.96	0.3386	20756.	13701.	7056.	36.4	2.62	0.1792
8.36	0.3381	20756.	13682.	7074.	36.6	2.62	0.1799
8.76	0.3375	20778.	13650.	7128.	36.7	2.63	0.1805
9.16	0.3370	20784.	13631.	7153.	36.9	2.63	0.1812
9.56	0.3366	20793.	13602.	7192.	36.9	2.63	0.1816
9.96	0.3363	20806.	13583.	7223.	37.0	2.63	0.1820
DELTAT = 0.50, PRINTING EVERY 10 STEPS							
14.96	0.3323	20846.	13412.	7434.	38.0	2.63	0.1869
19.96	0.3295	20871.	13304.	7568.	38.7	2.63	0.1903
24.96	0.3274	20887.	13234.	7653.	39.2	2.63	0.1928
29.96	0.3256	20911.	13183.	7729.	39.7	2.63	0.1950
34.96	0.3242	20921.	13154.	7767.	40.0	2.63	0.1966
39.96	0.3230	20927.	13122.	7805.	40.3	2.63	0.1981
44.96	0.3218	20924.	13100.	7823.	40.6	2.63	0.1996
49.96	0.3208	20930.	13075.	7856.	40.8	2.64	0.2007
54.96	0.3199	20933.	13059.	7874.	41.0	2.63	0.2018
59.96	0.3190	20930.	13043.	7887.	41.2	2.63	0.2028
64.96	0.3185	20924.	13024.	7900.	41.4	2.64	0.2034
69.96	0.3178	20914.	13011.	7903.	41.5	2.63	0.2042
74.96	0.3172	20915.	12995.	7920.	41.7	2.64	0.2049
79.96	0.3166	20909.	12983.	7926.	41.8	2.63	0.2056
84.96	0.3159	20899.	12983.	7916.	42.0	2.63	0.2064
89.96	0.3157	20896.	12970.	7926.	42.0	2.63	0.2067
94.96	0.3151	20893.	12964.	7929.	42.2	2.63	0.2074
99.96	0.3147	20889.	12954.	7935.	42.3	2.63	0.2078
104.96	0.3142	20887.	12951.	7936.	42.4	2.63	0.2084
109.96	0.3137	20887.	12948.	7939.	42.5	2.63	0.2089
114.96	0.3133	20893.	12942.	7952.	42.6	2.63	0.2094
119.96	0.3130	20884.	12942.	7942.	42.6	2.63	0.2097
124.96	0.3127	20890.	12932.	7958.	42.7	2.63	0.2102
129.96	0.3123	20890.	12932.	7958.	42.8	2.64	0.2105
134.96	0.3120	20884.	12932.	7952.	42.9	2.63	0.2109

M3070.015



RHEOLOGY DATA FOR FILE
M3070.016

INITIAL HEIGHT OF BED 196.7 MM
MASS OF PROPELLANT 0.8754 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
DELTAT = 0.04, PRINTING EVERY STEP							
0.00	0.4392	110.	121.	-11.	0.0	3.93	0.0000
0.04	0.4394	107.	122.	-14.	-0.1	3.93	-0.0004
0.08	0.4393	110.	118.	-8.	-0.1	3.93	-0.0003
0.12	0.4395	169.	124.	45.	-0.1	2.39	-0.0007
0.16	0.4356	1030.	741.	290.	1.2	2.67	0.0063
0.20	0.4200	2457.	1030.	627.	3.6	2.81	0.0182
0.24	0.4206	4365.	3338.	1026.	6.3	2.88	0.0320
0.28	0.4122	6553.	5053.	1500.	9.0	2.94	0.0459
0.32	0.4037	8036.	6047.	1989.	11.7	3.01	0.0595
0.36	0.3951	11071.	8606.	2465.	14.3	3.08	0.0728
0.40	0.3870	13292.	10307.	2905.	16.7	3.16	0.0851
0.44	0.3796	15424.	12115.	3310.	18.9	3.22	0.0960
0.48	0.3724	17432.	13766.	3666.	20.9	3.28	0.1064
0.52	0.3652	19249.	15207.	3963.	22.9	3.34	0.1165
0.56	0.3593	20884.	16652.	4232.	24.5	3.40	0.1246
0.60	0.3533	22344.	17865.	4480.	26.1	3.45	0.1327
0.64	0.3486	23609.	18932.	4677.	27.4	3.50	0.1390
0.68	0.3436	24712.	19853.	4860.	28.6	3.54	0.1455
0.72	0.3392	25657.	20643.	5014.	29.8	3.58	0.1513
0.76	0.3353	26483.	21332.	5152.	30.7	3.61	0.1563
0.80	0.3317	27167.	21907.	5260.	31.6	3.64	0.1607
0.84	0.3287	27736.	22380.	5356.	32.4	3.67	0.1645
0.88	0.3256	28202.	22780.	5422.	33.1	3.70	0.1683
0.92	0.3232	28587.	23101.	5486.	33.7	3.71	0.1713
0.96	0.3206	28901.	23367.	5534.	34.3	3.74	0.1745
1.00	0.3187	29152.	23570.	5582.	34.8	3.76	0.1768
1.04	0.3171	29358.	23723.	5635.	35.2	3.77	0.1787
1.08	0.3152	29523.	23841.	5682.	35.6	3.78	0.1811
1.12	0.3136	29665.	23942.	5723.	36.0	3.79	0.1829

PRINTING EVERY 10 STEPS

1.16	0.3120	29781.	24009.	5772.	36.4	3.79	0.1848
1.56	0.3019	30371.	24193.	6178.	38.7	3.84	0.1966
1.96	0.2959	30576.	24043.	6533.	40.0	3.86	0.2035
2.36	0.2916	30700.	23853.	6847.	41.0	3.88	0.2083
2.76	0.2882	30784.	23653.	7131.	41.7	3.88	0.2120
3.16	0.2858	30847.	23453.	7393.	42.2	3.89	0.2148
3.56	0.2832	30893.	23282.	7612.	42.8	3.90	0.2175

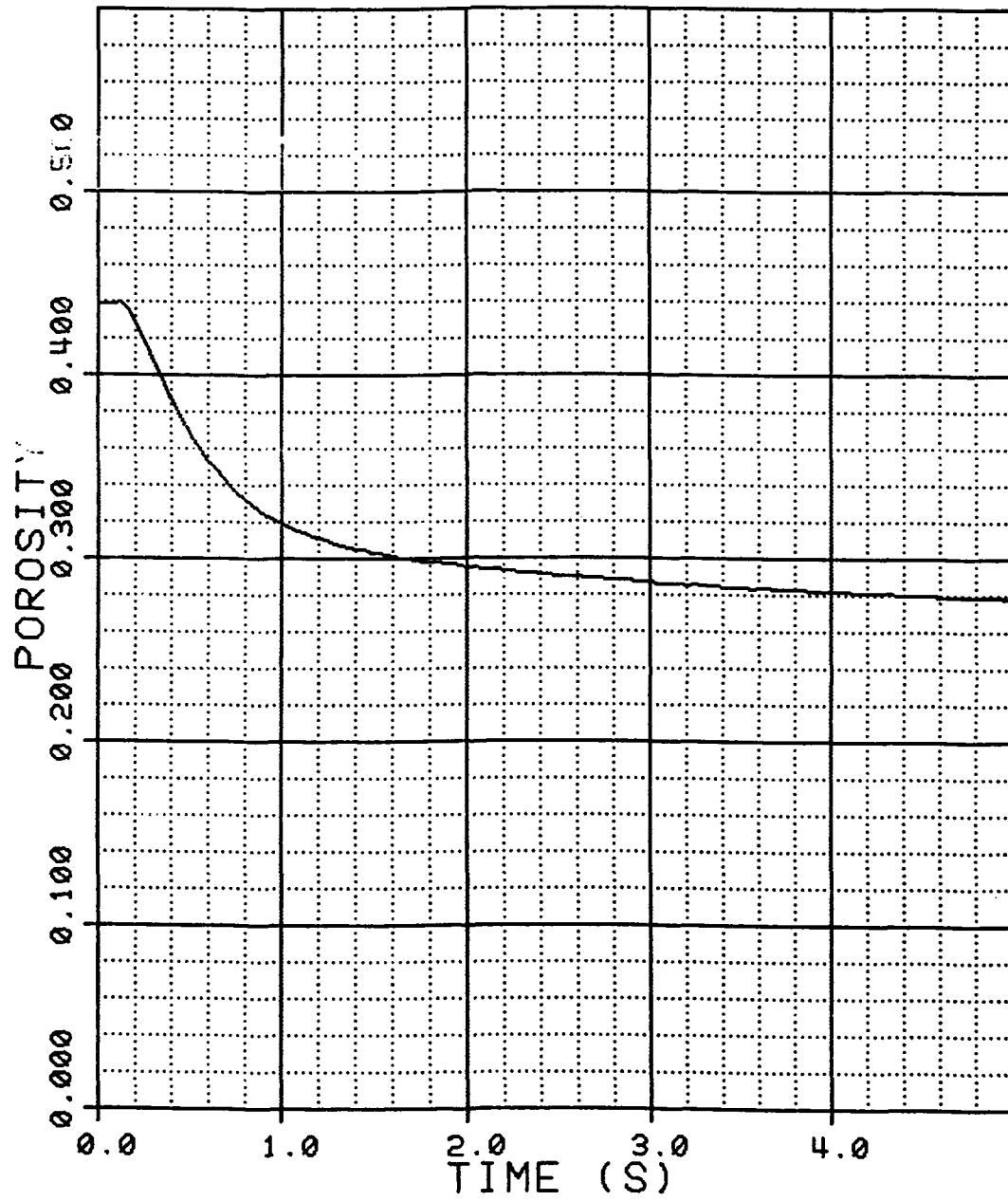
RHEOLOGY DATA FOR FILE
M3070.016

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.2820	30927.	23110.	7817.	43.1	3.90	0.2189
4.36	0.2802	30961.	22980.	7981.	43.4	3.91	0.2209
4.76	0.2789	30989.	22850.	8139.	43.7	3.91	0.2223
5.16	0.2776	31017.	22742.	8275.	44.0	3.91	0.2236
5.56	0.2766	31042.	22641.	8401.	44.2	3.91	0.2247
5.96	0.2755	31058.	22554.	8503.	44.4	3.92	0.2259
6.36	0.2746	31067.	22469.	8598.	44.6	3.92	0.2269
6.76	0.2736	31086.	22415.	8671.	44.8	3.92	0.2279
7.16	0.2728	31104.	22352.	8752.	45.0	3.92	0.2288
7.56	0.2722	31117.	22285.	8832.	45.1	3.91	0.2294
7.96	0.2716	31114.	22218.	8895.	45.3	3.91	0.2300
8.36	0.2708	31129.	22170.	8959.	45.4	3.92	0.2309
8.76	0.2702	31139.	22123.	9016.	45.5	3.92	0.2315
9.16	0.2696	31148.	22072.	9076.	45.7	3.92	0.2321
9.56	0.2691	31158.	22025.	9133.	45.8	3.91	0.2327
9.96	0.2687	31164.	21992.	9171.	45.9	3.92	0.2331

DELTAT = 0.50, PRINTING EVERY 10 STEPS

14.96	0.2640	31207.	21672.	9535.	46.8	3.92	0.2380
19.96	0.2604	31222.	21440.	9782.	47.5	3.93	0.2417
24.96	0.2579	31238.	21281.	9957.	48.1	3.93	0.2443
29.96	0.2558	31253.	21170.	10083.	48.5	3.93	0.2464
34.96	0.2541	31266.	21078.	10187.	48.8	3.93	0.2481
39.96	0.2527	31281.	21008.	10273.	49.1	3.93	0.2496
44.96	0.2513	31294.	20951.	10343.	49.4	3.93	0.2509
49.96	0.2503	31300.	20900.	10400.	49.6	3.93	0.2520
54.96	0.2496	31315.	20859.	10456.	49.7	3.93	0.2526
59.96	0.2484	31318.	20821.	10497.	49.9	3.93	0.2538
64.96	0.2478	31331.	20796.	10535.	50.1	3.93	0.2545
69.96	0.2468	31340.	20773.	10567.	50.2	3.92	0.2554
74.96	0.2462	31350.	20741.	10608.	50.4	3.93	0.2560
79.96	0.2455	31356.	20719.	10637.	50.5	3.92	0.2566
84.96	0.2449	31362.	20700.	10662.	50.6	3.92	0.2573
89.96	0.2444	31368.	20688.	10680.	50.7	3.93	0.2578
94.96	0.2438	31371.	20669.	10703.	50.8	3.93	0.2584
99.96	0.2436	31377.	20653.	10725.	50.9	3.92	0.2586
104.96	0.2429	31381.	20637.	10744.	51.0	3.93	0.2592
109.96	0.2422	31390.	20627.	10763.	51.1	3.93	0.2599
114.96	0.2418	31390.	20615.	10775.	51.2	3.93	0.2603
119.96	0.2418	31390.	20599.	10792.	51.2	3.94	0.2603
124.96	0.2409	31393.	20596.	10798.	51.4	3.94	0.2612
129.96	0.2404	31403.	20589.	10813.	51.5	3.94	0.2617
134.96	0.2400	31406.	20580.	10826.	51.5	3.94	0.2621

M3070.016



RHEOLOGY DATA FOR FILE
M3070.017

INITIAL HEIGHT OF BED 200.8 MM
MASS OF PROPELLANT 0.0755 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTAT = 0.04, PRINTING EVERY STEP

0.00	0.4505	115.	144.	-29.	0.0	3.89	0.0300
0.04	0.4506	121.	151.	-30.	-0.0	3.89	-0.0002
0.08	0.4507	118.	151.	-33.	-0.1	3.89	-0.0003
0.12	0.4505	121.	151.	-30.	-0.0	2.37	-0.0001
0.16	0.4497	438.	297.	141.	0.3	2.66	0.0015
0.20	0.4462	1159.	798.	361.	1.6	2.78	0.0077
0.24	0.4410	2268.	1630.	638.	3.4	2.81	0.0169
0.28	0.4343	3882.	2862.	1020.	5.8	2.85	0.0287
0.32	0.4271	5877.	4469.	1408.	8.2	2.92	0.0408
0.36	0.4192	8062.	6202.	1860.	10.8	2.98	0.0539
0.40	0.4113	10250.	7971.	2279.	13.4	3.05	0.0665
0.44	0.4039	12357.	9657.	2700.	15.7	3.12	0.0782
0.48	0.3967	14374.	11248.	3126.	17.9	3.17	0.0892
0.52	0.3897	16208.	12698.	3509.	20.0	3.23	0.0996
0.56	0.3830	17873.	14039.	3834.	22.0	3.28	0.1094
0.60	0.3770	19346.	15223.	4124.	23.7	3.33	0.1180
0.64	0.3711	20732.	16369.	4363.	25.3	3.37	0.1262
0.68	0.3658	22035.	17446.	4589.	26.8	3.42	0.1336
0.72	0.3606	23228.	18455.	4773.	28.2	3.47	0.1406
0.76	0.3554	24279.	19341.	4938.	29.6	3.51	0.1476
0.80	0.3516	25140.	20055.	5085.	30.6	3.54	0.1525
0.84	0.3480	25894.	20655.	5239.	31.6	3.58	0.1573
0.88	0.3442	26559.	21166.	5393.	32.6	3.61	0.1621
0.92	0.3412	27128.	21595.	5533.	33.3	3.62	0.1659
0.96	0.3380	27629.	21976.	5653.	34.1	3.66	0.1699
1.00	0.3355	28058.	22290.	5768.	34.8	3.67	0.1731
1.04	0.3332	28418.	22557.	5861.	35.3	3.69	0.1759
1.08	0.3312	28717.	22763.	5953.	35.8	3.71	0.1784
1.12	0.3291	28968.	22935.	6034.	36.3	3.73	0.1810

PRINTING EVERY 10 STEPS

1.16	0.3271	29161.	23052.	6109.	36.8	3.74	0.1834
1.56	0.3153	29942.	23227.	6715.	39.7	3.80	0.1975
1.96	0.3088	30224.	22992.	7232.	41.2	3.82	0.2050
2.36	0.3044	30383.	22716.	7667.	42.2	3.83	0.2101
2.76	0.3011	30492.	22449.	8043.	42.9	3.85	0.2138
3.16	0.2985	30578.	22217.	8361.	43.5	3.86	0.2167
3.56	0.2963	30638.	22011.	8627.	44.0	3.87	0.2191

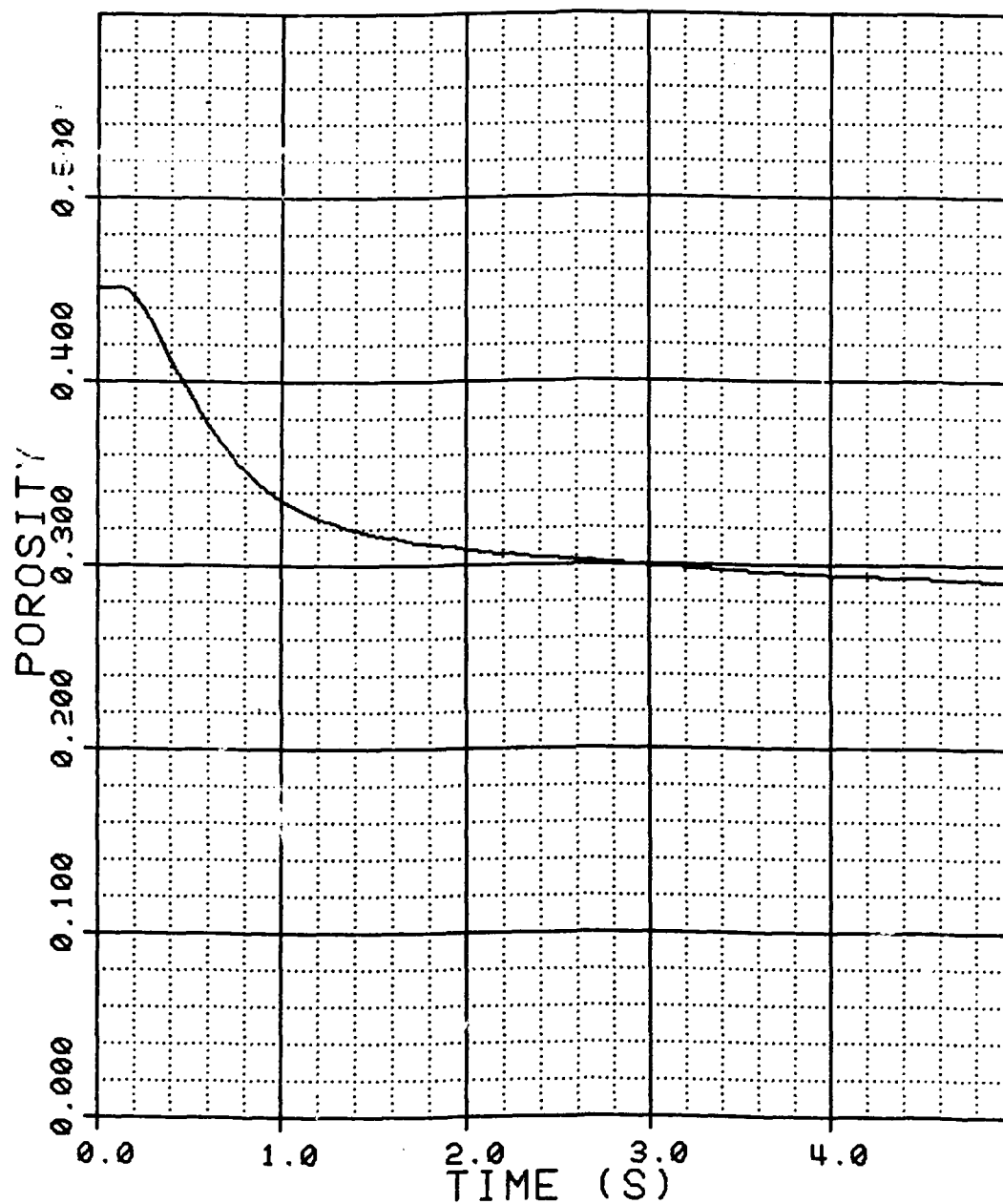
RHEOLOGY DATA FOR FILE
M3070.017

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.2947	30672.	21824.	8848.	44.4	3.87	0.2209
4.36	0.2930	30728.	21668.	9060.	44.7	3.87	0.2227
4.76	0.2915	30762.	21525.	9237.	45.1	3.88	0.2244
5.16	0.2902	30787.	21398.	9388.	45.4	3.89	0.2259
5.56	0.2891	30815.	21293.	9521.	45.6	3.89	0.2270
5.96	0.2882	30849.	21208.	9641.	45.8	3.90	0.2280
6.36	0.2873	30883.	21128.	9754.	46.0	3.89	0.2290
6.76	0.2862	30902.	21052.	9849.	46.2	3.90	0.2301
7.16	0.2857	30920.	20976.	9944.	46.3	3.89	0.2307
7.56	0.2848	30936.	20909.	10027.	46.5	3.90	0.2316
7.96	0.2842	30951.	20852.	10099.	46.6	3.90	0.2323
8.36	0.2836	30955.	20792.	10163.	46.8	3.90	0.2329
8.76	0.2831	30967.	20741.	10226.	46.9	3.90	0.2335
9.16	0.2823	30976.	20697.	10279.	47.1	3.90	0.2343
9.56	0.2819	30989.	20655.	10333.	47.1	3.90	0.2348
9.96	0.2815	30967.	20592.	10375.	47.2	3.90	0.2352

DELTAT = 1.00, PRINTING EVERY 10 STEPS

19.96	0.2740	31051.	20055.	10995.	48.8	3.91	0.2432
29.96	0.2691	31091.	19792.	11299.	49.8	3.92	0.2481
39.96	0.2660	31106.	19661.	11444.	50.5	3.94	0.2514
49.96	0.2640	31131.	19547.	11584.	50.9	3.92	0.2534
59.96	0.2621	31162.	19490.	11672.	51.3	3.92	0.2553
69.96	0.2607	31184.	19443.	11741.	51.6	3.92	0.2568
79.96	0.2595	31191.	19408.	11783.	51.8	3.92	0.2579
89.96	0.2580	31206.	19382.	11823.	52.1	3.93	0.2594
99.96	0.2571	31234.	19360.	11875.	52.3	3.93	0.2604
109.96	0.2563	31234.	19347.	11887.	52.4	3.92	0.2611
119.96	0.2553	31243.	19338.	11905.	52.6	3.93	0.2621
129.96	0.2546	31259.	19322.	11937.	52.8	3.93	0.2628
139.96	0.2537	31265.	19316.	11949.	53.0	3.93	0.2637
149.96	0.2533	31271.	19313.	11959.	53.0	3.94	0.2641
159.96	0.2525	31284.	19306.	11978.	53.2	3.93	0.2649
169.96	0.2519	31287.	19309.	11978.	53.3	3.93	0.2654
179.96	0.2513	31293.	19303.	11990.	53.4	3.94	0.2660
189.96	0.2510	31302.	19303.	11999.	53.5	3.94	0.2664
199.96	0.2505	31312.	19300.	12012.	53.6	3.94	0.2668
209.96	0.2500	31318.	19313.	12005.	53.7	3.94	0.2673
219.96	0.2494	31331.	19309.	12021.	53.8	3.95	0.2679
229.96	0.2488	31339.	19309.	12030.	53.9	3.95	0.2686
239.96	0.2487	31346.	19316.	12030.	53.9	3.95	0.2686
249.96	0.2482	31352.	19325.	12026.	54.0	3.95	0.2691
259.96	0.2480	31358.	19325.	12033.	54.1	3.94	0.2693

M3070.017



RHEOLOGY DATA FOR FILE
M3070.010

INITIAL HEIGHT OF BED 197.5 MM
MASS OF PROPELLANT 0.8742 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTAT = 0.04, PRINTING EVERY STEP

0.00	0.4421	107.	173.	-66.	0.0	3.93	0.0000
0.04	0.4419	104.	163.	-59.	0.1	3.93	0.0004
0.08	0.4420	107.	166.	-59.	0.0	3.94	0.0002
0.12	0.4420	107.	176.	-69.	0.0	2.42	0.0002
0.16	0.4421	166.	182.	-16.	0.0	2.74	0.0001
0.20	0.4412	558.	321.	236.	0.3	2.85	0.0017
0.24	0.4391	1176.	677.	499.	1.0	2.85	0.0053
0.28	0.4351	2096.	1287.	809.	2.4	2.87	0.0123
0.32	0.4296	3439.	2211.	1228.	4.3	2.92	0.0220
0.36	0.4230	5251.	3456.	1795.	6.6	2.97	0.0332
0.40	0.4153	7433.	4986.	2447.	9.1	3.03	0.0459
0.44	0.4073	9776.	6686.	3091.	11.6	3.10	0.0587
0.48	0.3993	12095.	8340.	3755.	14.1	3.17	0.0713
0.52	0.3917	14357.	9954.	4404.	16.4	3.24	0.0829
0.56	0.3842	16480.	11465.	5015.	18.6	3.29	0.0940
0.60	0.3773	18367.	12805.	5561.	20.5	3.36	0.1040
0.64	0.3708	20054.	13961.	6093.	22.4	3.40	0.1133
0.68	0.3647	21518.	14933.	6586.	24.1	3.45	0.1219
0.72	0.3590	22839.	15765.	7075.	25.6	3.49	0.1296
0.76	0.3539	24029.	16504.	7525.	27.0	3.54	0.1365
0.80	0.3492	25096.	17136.	7959.	28.2	3.58	0.1428
0.84	0.3447	26028.	17705.	8323.	29.4	3.62	0.1487
0.88	0.3400	26836.	18204.	8632.	30.4	3.65	0.1537
0.92	0.3373	27501.	18598.	8903.	31.2	3.67	0.1582
0.96	0.3343	28060.	18896.	9165.	32.0	3.70	0.1620
1.00	0.3316	28526.	19134.	9393.	32.6	3.72	0.1653
1.04	0.3289	28900.	19309.	9591.	33.3	3.74	0.1686
1.08	0.3266	29207.	19438.	9769.	33.9	3.75	0.1716
1.12	0.3246	29456.	19510.	9930.	34.4	3.77	0.1740

PRINTING EVERY 10 STEPS

1.16	0.3229	29667.	19566.	10101.	34.8	3.78	0.1761
1.56	0.3117	30457.	19201.	11256.	37.4	3.85	0.1895
1.96	0.3058	30643.	18638.	12005.	38.8	3.87	0.1964
2.36	0.3020	30764.	18216.	12548.	39.6	3.87	0.2007
2.76	0.2994	30845.	17896.	12949.	40.2	3.88	0.2037
3.16	0.2971	30910.	17645.	13266.	40.7	3.90	0.2063
3.56	0.2953	30960.	17445.	13515.	41.1	3.91	0.2083

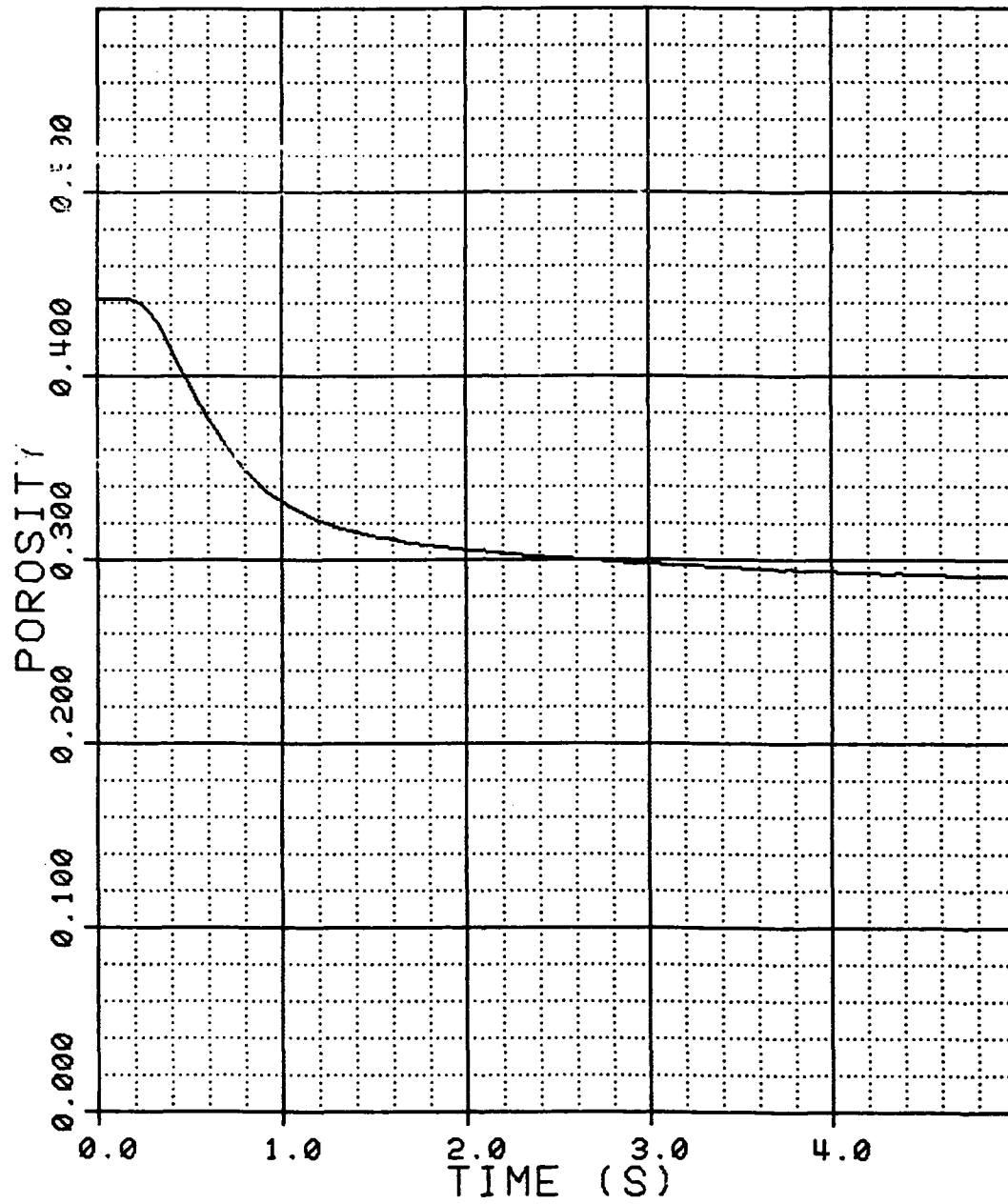
RHEOLOGY DATA FOR FILE
M3070.018

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.2939	31001.	17283.	13718.	41.5	3.91	0.2099
4.36	0.2926	31044.	17152.	13892.	41.7	3.91	0.2113
4.76	0.2913	31072.	17038.	14034.	42.0	3.92	0.2128
5.16	0.2900	31094.	16939.	14154.	42.3	3.91	0.2142
5.56	0.2890	31125.	16863.	14262.	42.5	3.92	0.2153
5.96	0.2882	31140.	16794.	14347.	42.7	3.92	0.2162
6.36	0.2874	31162.	16734.	14428.	42.9	3.92	0.2171
6.76	0.2864	31178.	16683.	14495.	43.1	3.92	0.2182
7.16	0.2858	31184.	16635.	14549.	43.2	3.92	0.2188
7.56	0.2851	31202.	16597.	14606.	43.4	3.92	0.2196
7.96	0.2846	31199.	16555.	14644.	43.5	3.92	0.2202
8.36	0.2838	31221.	16520.	14701.	43.6	3.92	0.2210
8.76	0.2832	31236.	16495.	14741.	43.8	3.93	0.2217
9.16	0.2828	31246.	16470.	14776.	43.9	3.93	0.2221
9.56	0.2822	31258.	16441.	14818.	44.0	3.92	0.2228
9.96	0.2817	31261.	16422.	14839.	44.1	3.93	0.2233

DELTAT = 2.50. PRINTING EVERY 10 STEPS

34.96	0.2682	31336.	16016.	15320.	46.9	3.93	0.2377
59.96	0.2623	31383.	15984.	15399.	48.1	3.94	0.2438
84.96	0.2584	31420.	16038.	15382.	48.9	3.94	0.2477
109.96	0.2557	31454.	16101.	15352.	49.5	3.95	0.2504
134.96	0.2536	31479.	16171.	15307.	49.9	3.95	0.2526
159.96	0.2516	31488.	16232.	15256.	50.3	3.96	0.2546
184.96	0.2503	31501.	16276.	15225.	50.5	3.96	0.2558
209.96	0.2485	31522.	16337.	15185.	50.9	3.97	0.2576
234.96	0.2474	31538.	16384.	15154.	51.1	3.96	0.2588
259.96	0.2468	31553.	16438.	15115.	51.2	3.95	0.2593
284.96	0.2453	31578.	16492.	15086.	51.5	3.97	0.2608
309.96	0.2444	31587.	16530.	15057.	51.7	3.97	0.2616
334.96	0.2433	31600.	16584.	15016.	51.9	3.98	0.2628
359.96	0.2425	31625.	16616.	15009.	52.0	3.98	0.2635
384.96	0.2418	31640.	16657.	14983.	52.2	3.99	0.2642
409.96	0.2410	31659.	16705.	14954.	52.3	3.99	0.2650
434.96	0.2402	31671.	16750.	14921.	52.5	3.99	0.2657
459.96	0.2396	31699.	16788.	14911.	52.6	4.00	0.2663
484.96	0.2391	31715.	16826.	14889.	52.7	4.00	0.2668
509.96	0.2386	31733.	16865.	14869.	52.8	4.00	0.2673
534.96	0.2380	31755.	16896.	14859.	52.9	4.00	0.2679
559.96	0.2374	31777.	16928.	14850.	53.0	4.01	0.2685
584.96	0.2370	31792.	16962.	14830.	53.1	4.01	0.2688
609.96	0.2364	31808.	16991.	14817.	53.2	4.01	0.2694
634.96	0.2358	31833.	17023.	14810.	53.3	4.02	0.2700

M3070.018



RHEOLOGY DATA FOR FILE
M30145.019

INITIAL HEIGHT OF BED 210.5 MM
MASS OF PROPELLANT 0.8762 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTA T = 0.04. PRINTING EVERY STEP

0.00	0.4753	87.	113.	-26.	0.0	7.88	0.0300
0.04	0.4752	89.	113.	-23.	0.0	7.87	0.0001
0.08	0.4753	80.	113.	-33.	-0.0	7.87	-0.0000
0.12	0.4754	80.	113.	-32.	-0.0	6.63	-0.0001
0.16	0.4752	108.	122.	-14.	0.0	5.72	0.0001
0.20	0.4738	425.	246.	179.	0.6	6.01	0.0028
0.24	0.4695	776.	436.	341.	2.3	6.01	0.0110
0.28	0.4636	1137.	637.	501.	4.6	5.99	0.0218
0.32	0.4557	1582.	871.	710.	7.6	5.97	0.0360
0.36	0.4460	2144.	1164.	981.	11.1	5.97	0.0528
0.40	0.4354	2850.	1523.	1327.	14.9	5.98	0.0706
0.44	0.4235	3742.	1963.	1760.	18.9	5.98	0.0899
0.48	0.4104	4827.	2577.	2251.	23.2	6.01	0.1100
0.52	0.3964	6173.	3340.	2825.	27.5	6.04	0.1307
0.56	0.3813	7768.	4256.	3512.	32.0	6.08	0.1520
0.60	0.3655	9612.	5275.	4336.	36.4	6.12	0.1730
0.64	0.3489	11791.	6482.	5309.	40.9	6.17	0.1942
0.68	0.3317	14290.	7848.	6443.	45.2	6.24	0.2148
0.72	0.3142	17157.	9400.	7757.	49.4	6.32	0.2350
0.76	0.2960	20362.	11089.	9273.	53.6	6.40	0.2547
0.80	0.2782	23893.	12909.	10984.	57.5	6.50	0.2731
0.84	0.2600	27701.	14845.	12856.	61.2	6.61	0.2910
0.88	0.2425	31740.	16868.	14872.	64.7	6.72	0.3073
0.92	0.2254	35937.	18951.	16986.	67.9	6.84	0.3226
0.96	0.2093	40221.	21037.	19183.	70.8	6.96	0.3364
1.00	0.1948	44392.	23076.	21317.	73.3	7.08	0.3484
1.04	0.1815	48272.	24958.	23314.	75.5	7.20	0.3590
1.08	0.1700	51623.	26609.	25013.	77.4	7.29	0.3678
1.12	0.1599	54389.	27991.	26399.	79.0	7.37	0.3754

PRINTING EVERY 10 STEPS

1.16	0.1516	56522.	29086.	27436.	80.3	7.44	0.3815
1.56	0.1183	60917.	31908.	29009.	85.2	7.62	0.4049
1.96	0.1078	61352.	32740.	28612.	86.7	7.67	0.4119
2.36	0.1021	61591.	33398.	28194.	87.5	7.70	0.4157
2.76	0.0980	61809.	33969.	27840.	88.0	7.71	0.4183
3.16	0.0948	62005.	34480.	27525.	88.5	7.75	0.4204
3.56	0.0928	62157.	34928.	27230.	88.8	7.76	0.4222

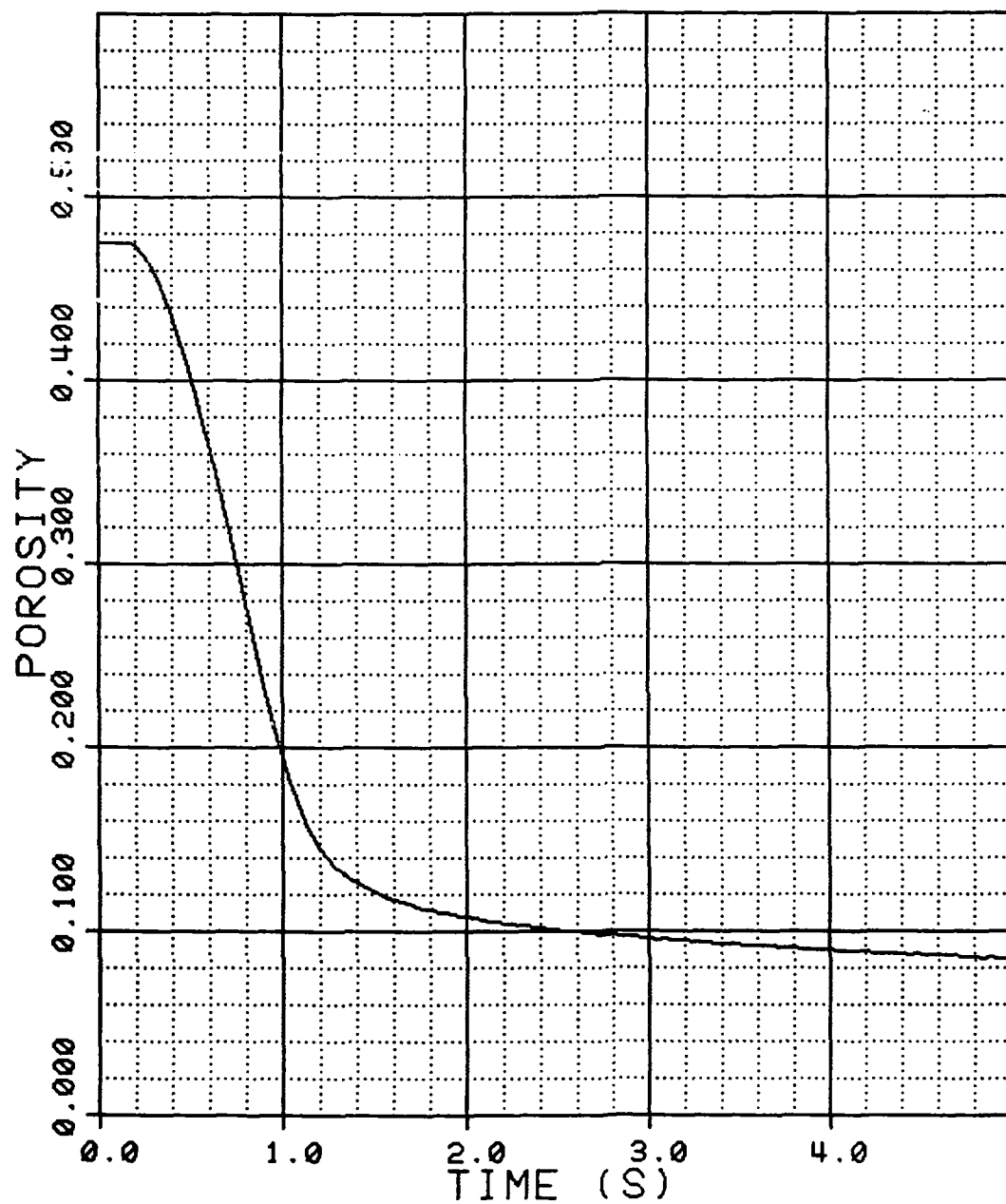
RHEOLOGY DATA FOR FILE
M30145.019

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.0897	62303.	35334.	26969.	89.2	7.78	0.4236
4.36	0.0878	62418.	35703.	26715.	89.4	7.79	0.4248
4.76	0.0861	62539.	36030.	26510.	89.6	7.81	0.4259
5.16	0.0845	62639.	36338.	26301.	89.8	7.82	0.4269
5.56	0.0832	62726.	36617.	26109.	90.0	7.84	0.4277
5.96	0.0822	62810.	36858.	25952.	90.1	7.85	0.4283
6.36	0.0809	62863.	37080.	25783.	90.3	7.85	0.4291
6.76	0.0798	62940.	37306.	25634.	90.4	7.86	0.4298
7.16	0.0791	62987.	37509.	25478.	90.5	7.86	0.4303
7.56	0.0779	63015.	37697.	25318.	90.7	7.86	0.4309
7.96	0.0774	63052.	37865.	25188.	90.8	7.86	0.4313
8.36	0.0766	63084.	38027.	25057.	90.9	7.86	0.4318
8.76	0.0758	63109.	38179.	24930.	91.0	7.88	0.4323
9.16	0.0754	63143.	38322.	24821.	91.0	7.86	0.4325
9.56	0.0745	63155.	38465.	24690.	91.1	7.87	0.4331
9.96	0.0740	63177.	38592.	24585.	91.2	7.88	0.4334

DELTA T = 2.50, PRINTING EVERY 10 STEPS

34.96	0.0599	63304.	41532.	21772.	93.0	7.91	0.4419
59.96	0.0546	63348.	42441.	20907.	93.6	7.93	0.4450
84.96	0.0519	63382.	42865.	20517.	94.0	7.94	0.4466
109.96	0.0497	63410.	43110.	20300.	94.3	7.94	0.4479
134.96	0.0488	63432.	43250.	20182.	94.4	7.95	0.4484
159.96	0.0473	63447.	43348.	20099.	94.6	7.95	0.4493
184.96	0.0464	63472.	43405.	20067.	94.7	7.94	0.4498
209.96	0.0455	63488.	43447.	20042.	94.8	7.95	0.4503
234.96	0.0452	63482.	43466.	20016.	94.8	7.94	0.4504
259.96	0.0444	63500.	43481.	20019.	94.9	7.96	0.4509
284.96	0.0441	63506.	43491.	20016.	94.9	7.94	0.4511
309.96	0.0437	63515.	43504.	20012.	95.0	7.97	0.4513
334.96	0.0432	63528.	43504.	20024.	95.0	7.96	0.4516
359.96	0.0432	63525.	43497.	20027.	95.0	7.96	0.4516
384.96	0.0425	63537.	43498.	20040.	95.1	7.96	0.4520
409.96	0.0422	63553.	43485.	20069.	95.2	7.95	0.4522
434.96	0.0417	63559.	43475.	20083.	95.2	7.96	0.4524
459.96	0.0416	63569.	43456.	20112.	95.2	7.97	0.4525
484.96	0.0416	63575.	43434.	20141.	95.2	7.97	0.4525
509.96	0.0411	63572.	43425.	20147.	95.3	7.97	0.4528
534.96	0.0410	63575.	43406.	20169.	95.3	7.98	0.4529
559.96	0.0406	63590.	43380.	20210.	95.4	7.98	0.4531
584.96	0.0406	63593.	43358.	20236.	95.4	7.98	0.4531
609.96	0.0409	63600.	43339.	20261.	95.3	7.95	0.4529
634.96	0.0403	63600.	43317.	20283.	95.4	7.98	0.4533

M30145.019



RHEOLOGY DATA FOR FILE
M30145.020

INITIAL HEIGHT OF BED 204.1 MM
MASS OF PROPELLANT 0.0754 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTAT = 0.04, PRINTING EVERY STEP

0.00	0.4595	124.	144.	-21.	0.0	7.82	0.0300
0.04	0.4596	120.	141.	-20.	-0.0	7.83	-0.0001
0.08	0.4597	127.	148.	-21.	-0.0	7.83	-0.0002
0.12	0.4597	127.	141.	-14.	-0.1	7.28	-0.0003
0.16	0.4592	295.	192.	103.	0.1	5.67	0.0006
0.20	0.4527	894.	589.	305.	2.5	6.07	0.0125
0.24	0.4431	1535.	992.	543.	6.0	6.10	0.0296
0.28	0.4311	2319.	1497.	822.	10.2	6.12	0.0500
0.32	0.4174	3289.	2123.	1166.	14.8	6.15	0.0723
0.36	0.4026	4529.	2936.	1593.	19.5	6.20	0.0954
0.40	0.3865	6118.	3942.	2176.	24.3	6.32	0.1191
0.44	0.3695	8096.	5219.	2877.	29.1	6.40	0.1428
0.48	0.3512	10555.	6788.	3767.	34.1	6.56	0.1670
0.52	0.3315	13664.	8693.	4971.	39.1	6.66	0.1916
0.56	0.3087	17837.	11236.	6601.	44.6	6.72	0.2183
0.60	0.2845	22451.	13971.	8480.	49.9	6.76	0.2446
0.64	0.2619	27323.	16743.	10580.	54.7	6.82	0.2678
0.68	0.2414	32310.	19518.	12792.	58.7	6.89	0.2875
0.72	0.2228	37244.	22223.	15020.	62.2	6.98	0.3046
0.76	0.2067	41895.	24742.	17153.	65.1	7.10	0.3188
0.80	0.1924	46192.	27059.	19132.	67.5	7.18	0.3308
0.84	0.1800	50050.	29143.	20907.	69.6	7.28	0.3489
0.88	0.1702	53286.	30857.	22429.	71.2	7.36	0.3487
0.92	0.1615	55820.	32197.	23623.	72.6	7.44	0.3555
0.96	0.1546	57657.	33156.	24501.	73.6	7.49	0.3607
1.00	0.1492	58919.	33798.	25122.	74.5	7.53	0.3648
1.04	0.1448	59728.	34194.	25534.	75.1	7.56	0.3688
1.08	0.1417	60166.	34413.	25753.	75.6	7.58	0.3703
1.12	0.1386	60418.	34521.	25896.	76.1	7.59	0.3726

PRINTING EVERY 10 STEPS

1.16	0.1363	60592.	34591.	26001.	76.4	7.60	0.3743
1.56	0.1234	61198.	34804.	26394.	78.3	7.65	0.3835
1.96	0.1175	61332.	34953.	26379.	79.1	7.67	0.3876
2.36	0.1135	61546.	35172.	26374.	79.7	7.70	0.3904
2.76	0.1108	61720.	35410.	26310.	80.1	7.71	0.3922
3.16	0.1083	61876.	35623.	26253.	80.4	7.72	0.3939
3.56	0.1067	62003.	35829.	26174.	80.6	7.73	0.3950

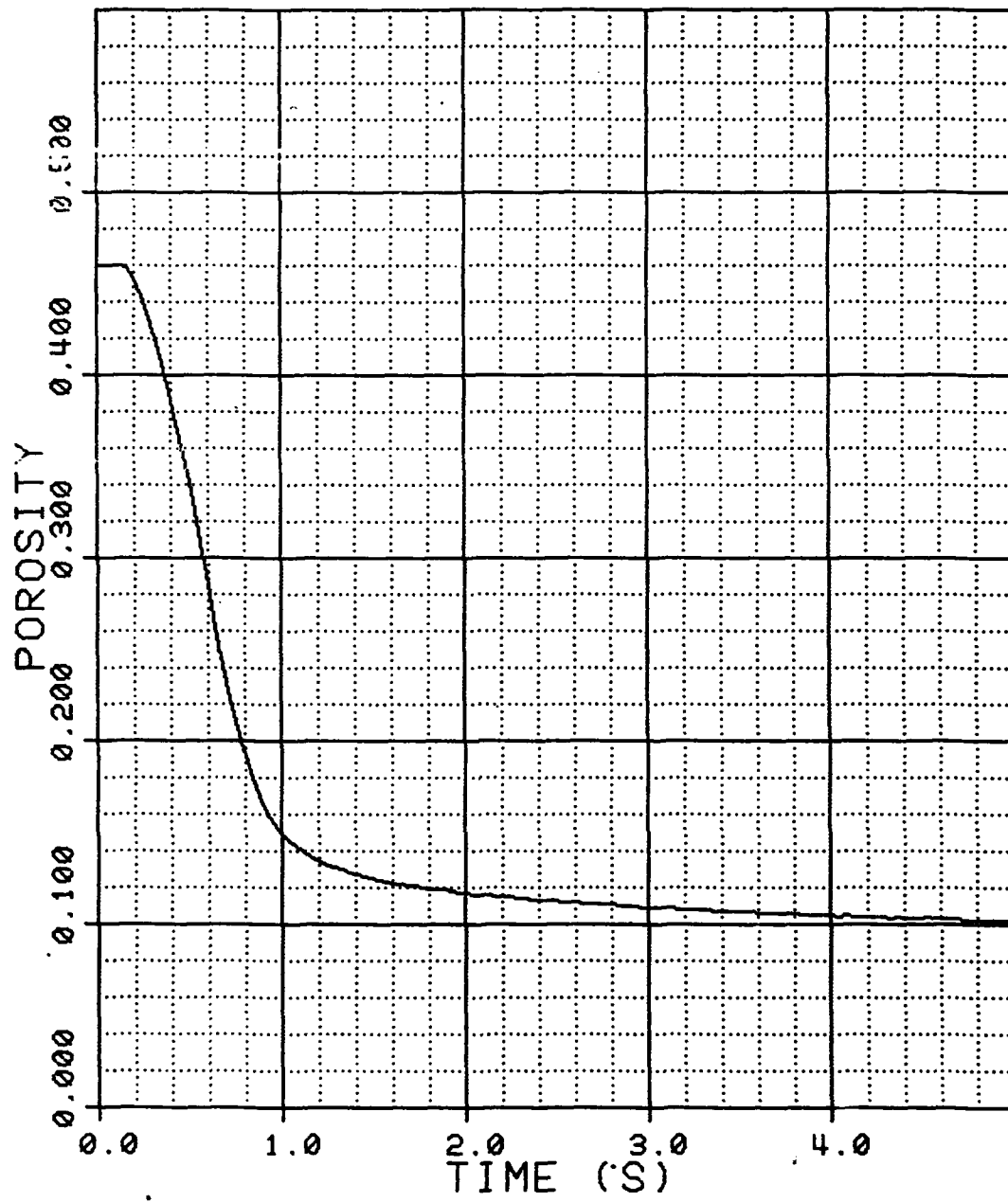
RHEOLOGY DATA FOR FILE
M30145.020

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.1050	62118.	36026.	26092.	80.9	7.75	0.3962
4.36	0.1037	62218.	36214.	26004.	81.0	7.76	0.3970
4.76	0.1021	62302.	36388.	25913.	81.3	7.77	0.3981
5.16	0.1012	62392.	36547.	25845.	81.4	7.78	0.3987
5.56	0.1002	62435.	36690.	25746.	81.5	7.79	0.3994
5.96	0.0992	62489.	36823.	25665.	81.7	7.80	0.4000
6.36	0.0986	62526.	36947.	25579.	81.7	7.81	0.4004
6.76	0.0977	62560.	37062.	25498.	81.9	7.81	0.4010
7.16	0.0971	62538.	37166.	25372.	81.9	7.82	0.4014
7.56	0.0962	62641.	37281.	25360.	82.1	7.82	0.4020
7.96	0.0956	62647.	37376.	25271.	82.1	7.82	0.4024
8.36	0.0948	62684.	37474.	25210.	82.3	7.82	0.4029
8.76	0.0947	62700.	37560.	25140.	82.3	7.83	0.4030
9.16	0.0940	62703.	37636.	25067.	82.4	7.82	0.4035
9.56	0.0933	62718.	37715.	25003.	82.5	7.83	0.4039
9.96	0.0932	62731.	37795.	24936.	82.5	7.83	0.4040

DELTAT = 2.50. PRINTING EVERY 10 STEPS

34.96	0.0813	62802.	39725.	23077.	84.0	7.85	0.4117
59.96	0.0771	62843.	40497.	22345.	84.6	7.85	0.4144
84.96	0.0742	62874.	40913.	21961.	85.0	7.85	0.4163
109.96	0.0721	62898.	41184.	21715.	85.2	7.85	0.4175
134.96	0.0706	62911.	41358.	21553.	85.4	7.86	0.4185
159.96	0.0701	62927.	41485.	21442.	85.5	7.86	0.4188
184.96	0.0692	62952.	41580.	21371.	85.6	7.86	0.4194
209.96	0.0682	62961.	41657.	21304.	85.7	7.87	0.4200
234.96	0.0676	62970.	41704.	21267.	85.8	7.86	0.4204
259.96	0.0669	62979.	41748.	21231.	85.9	7.86	0.4208
284.96	0.0664	62986.	41783.	21203.	86.0	7.87	0.4211
309.96	0.0658	62992.	41809.	21183.	86.0	7.88	0.4215
334.96	0.0656	62986.	41834.	21152.	86.1	7.88	0.4216
359.96	0.0653	63017.	41856.	21161.	86.1	7.89	0.4218
384.96	0.0650	63026.	41875.	21151.	86.1	7.89	0.4220
409.96	0.0646	63036.	41894.	21141.	86.2	7.89	0.4222
434.96	0.0642	63045.	41897.	21140.	86.2	7.88	0.4225
459.96	0.0635	63060.	41910.	21150.	86.3	7.89	0.4229
484.96	0.0634	63054.	41920.	21134.	86.3	7.89	0.4230
509.96	0.0634	63060.	41923.	21137.	86.3	7.91	0.4230
534.96	0.0631	63070.	41929.	21140.	86.4	7.90	0.4232
559.96	0.0629	63082.	41929.	21153.	86.4	7.90	0.4232
584.96	0.0627	63085.	41929.	21156.	86.4	7.90	0.4234
609.96	0.0624	63098.	41933.	21165.	86.5	7.90	0.4236
634.96	0.0624	63104.	41939.	21165.	86.5	7.89	0.4236

M30145.020



RHEOLOGY DATA FOR FILE
M30145.021

INITIAL HEIGHT OF BED 200.5 MM
MASS OF PROPELLANT 0.8755 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTAT = 0.04. PRINTING EVERY STEP

0.00	0.4497	156.	156.	-0.	0.0	7.82	0.0000
0.04	0.4497	156.	139.	17.	0.0	7.82	0.0001
0.08	0.4505	171.	98.	73.	-0.3	7.78	-0.0013
0.12	0.4498	153.	143.	10.	-0.0	7.55	-0.0002
0.16	0.4497	170.	114.	56.	0.0	5.61	0.0001
0.20	0.4498	169.	146.	23.	-0.0	6.12	-0.0001
0.24	0.4498	194.	146.	48.	-0.0	6.16	-0.0001
0.28	0.4502	218.	162.	56.	-0.2	6.18	-0.0008
0.32	0.4497	238.	152.	85.	0.0	6.20	0.0001
0.36	0.4494	321.	172.	150.	0.1	6.23	0.0006
0.40	0.4483	452.	248.	204.	0.5	6.27	0.0025
0.44	0.4472	589.	321.	268.	0.9	6.33	0.0046
0.48	0.4456	735.	483.	331.	1.5	6.51	0.0075
0.52	0.4409	1183.	686.	497.	3.2	6.68	0.0158
0.56	0.4288	2258.	1388.	870.	7.6	6.71	0.0380
0.60	0.4092	3872.	2423.	1449.	13.8	6.68	0.0686
0.64	0.3912	5650.	3539.	2112.	19.3	6.67	0.0962
0.68	0.3747	7481.	4653.	2828.	24.1	6.68	0.1200
0.72	0.3598	9296.	5707.	3589.	28.2	6.68	0.1404
0.76	0.3458	11183.	6772.	4411.	31.9	6.67	0.1580
0.80	0.3323	13120.	7786.	5334.	35.3	6.71	0.1759
0.84	0.3204	15078.	8851.	6227.	38.2	6.73	0.1903
0.88	0.3084	17139.	9925.	7215.	41.0	6.76	0.2044
0.92	0.2971	19194.	11001.	8193.	43.5	6.83	0.2172
0.96	0.2858	21264.	12075.	9190.	46.0	6.89	0.2296
1.00	0.2748	23436.	13215.	10221.	48.4	6.95	0.2412
1.04	0.2650	25678.	14374.	11304.	50.4	7.01	0.2513
1.08	0.2550	28022.	15609.	12413.	52.4	7.05	0.2614
1.12	0.2450	30462.	16880.	13582.	54.4	7.10	0.2712

PRINTING EVERY 10 STEPS

1.16	0.2351	32984.	18185.	14799.	56.3	7.15	0.2806
1.56	0.1613	56491.	30336.	26155.	69.0	7.43	0.3439
1.96	0.1353	60120.	32572.	27547.	72.9	7.53	0.3636
2.36	0.1309	60376.	32860.	27517.	73.6	7.50	0.3669
2.76	0.1236	60591.	33309.	27282.	74.6	7.56	0.3721
3.16	0.1205	60783.	33683.	27101.	75.1	7.59	0.3744
3.56	0.1173	60950.	34033.	26917.	75.5	7.60	0.3766

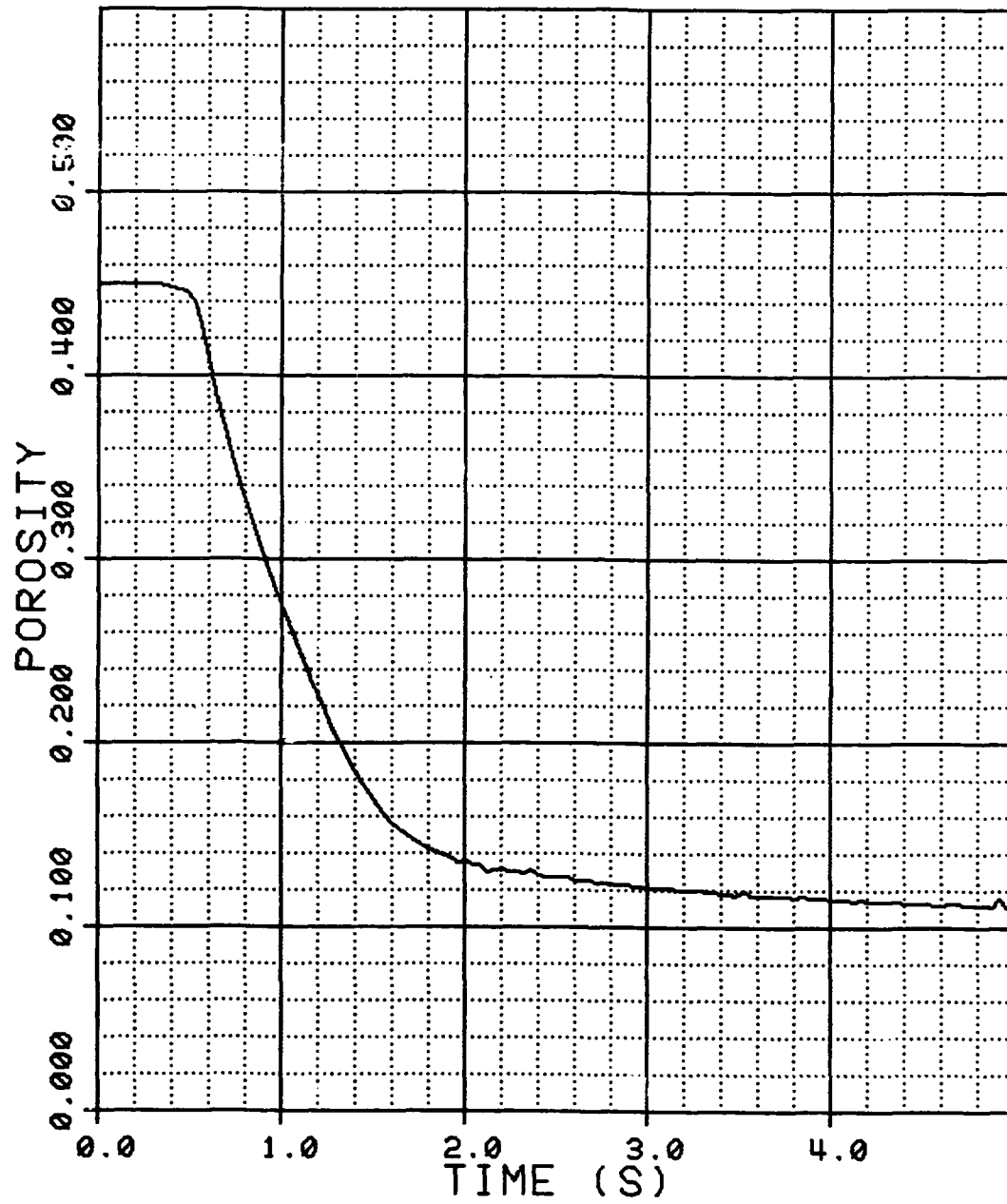
RHEOLOGY DATA FOR FILE
M30145.021

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.1156	61159.	34347.	26812.	75.7	7.63	0.3778
4.36	0.1138	61358.	34652.	26706.	76.0	7.66	0.3790
4.76	0.1119	61535.	34951.	26585.	76.3	7.68	0.3804
5.16	0.1105	61684.	35214.	26470.	76.5	7.69	0.3813
5.56	0.1095	61818.	35459.	26359.	76.6	7.71	0.3820
5.96	0.1083	61936.	35681.	26255.	76.8	7.73	0.3829
6.36	0.1072	62023.	35878.	26146.	76.9	7.75	0.3837
6.76	0.1061	62129.	36072.	26057.	77.1	7.76	0.3844
7.16	0.1053	62223.	36252.	25970.	77.2	7.77	0.3850
7.56	0.1053	62315.	36433.	25881.	77.2	7.78	0.3850
7.96	0.1029	62322.	36606.	25716.	77.5	7.80	0.3866
8.36	0.1041	62455.	36735.	25720.	77.4	7.80	0.3858
8.76	0.1024	62475.	36869.	25606.	77.6	7.79	0.3869
9.16	0.1005	62534.	36970.	25564.	77.8	7.79	0.3882
9.56	0.1013	62536.	37097.	25439.	77.7	7.79	0.3877
9.96	0.1010	62558.	37205.	25353.	77.8	7.79	0.3879

DELTAT = 2.50, PRINTING EVERY 10 STEPS

34.96	0.0885	62651.	39654.	22997.	79.5	7.82	0.3963
59.96	0.0844	62617.	40467.	22150.	80.0	7.81	0.3990
84.96	0.0819	62580.	40851.	21728.	80.3	7.82	0.4007
109.96	0.0809	62546.	41061.	21485.	80.5	7.82	0.4013
134.96	0.0785	62487.	41169.	21318.	80.8	7.82	0.4028
159.96	0.0780	62462.	41245.	21217.	80.8	7.83	0.4032
184.96	0.0771	62471.	41292.	21179.	81.0	7.82	0.4037
209.96	0.0764	62424.	41344.	21081.	81.1	7.83	0.4042
234.96	0.0757	62397.	41340.	21057.	81.1	7.83	0.4047
259.96	0.0757	62415.	41385.	21030.	81.1	7.83	0.4047
284.96	0.0745	62443.	41413.	21030.	81.3	7.83	0.4054
309.96	0.0743	62474.	41420.	21055.	81.3	7.82	0.4056
334.96	0.0739	62493.	41433.	21060.	81.4	7.84	0.4058
359.96	0.0737	62568.	41458.	21189.	81.4	7.82	0.4059
384.96	0.0731	62566.	41426.	21140.	81.5	7.79	0.4063
409.96	0.0744	62596.	41465.	21131.	81.3	7.80	0.4055
434.96	0.0749	62617.	41474.	21143.	81.5	7.83	0.4065
459.96	0.0726	62600.	41436.	21164.	81.5	7.81	0.4067
484.96	0.0722	62645.	41461.	21184.	81.6	7.83	0.4069
509.96	0.0724	62655.	41455.	21200.	81.6	7.83	0.4068
534.96	0.0719	62673.	41445.	21227.	81.6	7.83	0.4071
559.96	0.0720	62714.	41455.	21259.	81.6	7.84	0.4070
584.96	0.0719	62754.	41445.	21309.	81.6	7.83	0.4071
609.96	0.0714	62735.	41435.	21300.	81.7	7.83	0.4074
634.96	0.0712	62707.	41429.	21278.	81.7	7.84	0.4075

M30145.021



RHEOLOGY DATA FOR FILE
M3065.022

INITIAL HEIGHT OF BED 195.4 MM
MASS OF PROPELLANT 0.0759 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
DELTAT = 0.04. PRINTING EVERY STEP							
0.00	0.4351	138.	216.	-78.	0.0	7.58	0.0300
0.04	0.4353	145.	206.	-62.	-0.1	7.57	-0.0004
0.08	0.4352	148.	196.	-48.	-0.1	7.59	-0.0003
0.12	0.4351	135.	216.	-81.	-0.0	6.46	-0.0001
0.16	0.4352	138.	219.	-81.	-0.0	5.29	-0.0002
0.20	0.4351	150.	225.	-75.	-0.0	5.60	-0.0001
0.24	0.4354	184.	241.	-56.	-0.1	5.60	-0.0006
0.28	0.4364	234.	216.	18.	-0.5	5.54	-0.0024
0.32	0.4352	228.	269.	-41.	-0.0	5.57	-0.0001
0.36	0.4343	265.	311.	-46.	0.3	5.57	0.0014
0.40	0.4349	337.	343.	-6.	0.1	5.55	0.0003
0.44	0.4346	427.	400.	27.	0.1	5.55	0.0007
0.48	0.4345	526.	457.	69.	0.2	5.54	0.0010
0.52	0.4340	641.	521.	121.	0.4	5.53	0.0019
0.56	0.4338	769.	597.	172.	0.4	5.52	0.0022
0.60	0.4335	921.	695.	225.	0.5	5.51	0.0027
0.64	0.4332	1087.	826.	261.	0.6	5.52	0.0033
0.68	0.4327	1331.	943.	388.	0.8	5.50	0.0042
0.72	0.4320	1620.	1136.	484.	1.1	5.50	0.0054
0.76	0.4309	2062.	1406.	596.	1.4	5.50	0.0073
0.80	0.4298	2493.	1749.	744.	1.8	5.50	0.0092
0.84	0.4282	3174.	2203.	970.	2.4	5.49	0.0120
0.88	0.4259	4132.	2806.	1326.	3.1	5.49	0.0159
0.92	0.4232	5607.	3826.	1781.	4.0	5.56	0.0207
0.96	0.4191	7808.	5356.	2452.	5.4	5.62	0.0275
1.00	0.4136	11105.	7759.	3346.	7.1	5.73	0.0366
1.04	0.4064	15649.	11147.	4502.	9.5	5.86	0.0484
1.08	0.3972	20469.	14976.	5493.	12.3	5.98	0.0629
1.12	0.3869	25557.	18725.	6832.	15.4	6.12	0.0786

PRINTING EVERY 10 STEPS

1.16	0.3756	28209.	21391.	6818.	18.6	6.15	0.0952
1.56	0.2963	59349.	44841.	15308.	38.5	7.16	0.1972
1.96	0.2866	61238.	46438.	14800.	40.7	7.28	0.2082
2.36	0.2839	61111.	46761.	14349.	41.3	7.32	0.2111
2.76	0.2818	61397.	47384.	14092.	41.7	7.35	0.2134
3.16	0.2803	61661.	47698.	13963.	42.0	7.39	0.2151
3.56	0.2785	61843.	48083.	13760.	42.4	7.41	0.2170

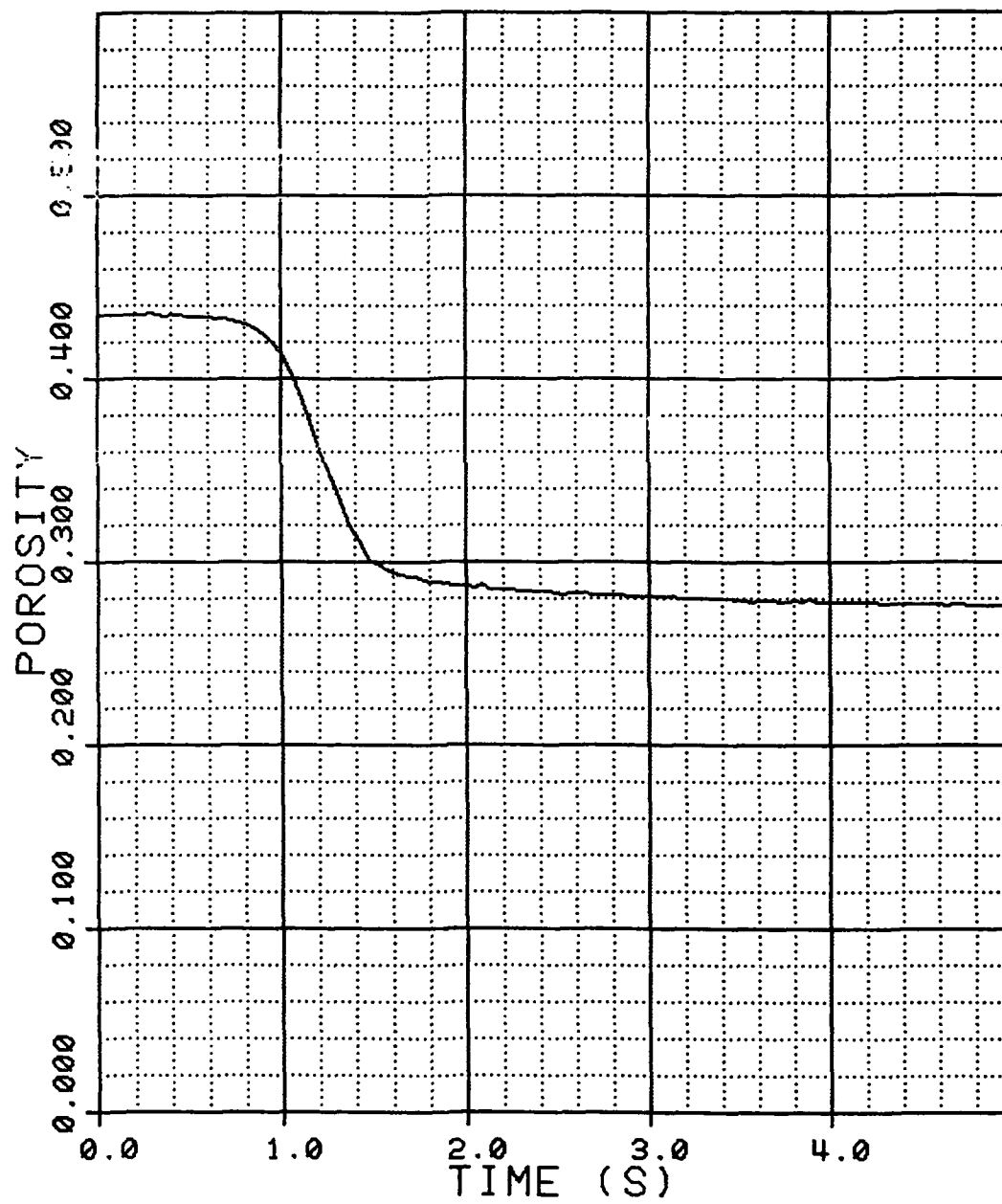
RHEOLOGY DATA FOR FILE
M3065.022

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.2780	62068.	48362.	13706.	42.5	7.44	0.2175
4.36	0.2771	62251.	48590.	13661.	42.7	7.46	0.2185
4.76	0.2762	62410.	48847.	13563.	42.9	7.48	0.2195
5.16	0.2755	62559.	49044.	13515.	43.0	7.50	0.2203
5.56	0.2749	62674.	49257.	13417.	43.2	7.52	0.2209
5.96	0.2742	62854.	49422.	13432.	43.3	7.54	0.2216
6.36	0.2735	62981.	49476.	13506.	43.4	7.54	0.2224
6.76	0.2730	63038.	49650.	13387.	43.6	7.55	0.2230
7.16	0.2725	63097.	49803.	13294.	43.7	7.57	0.2235
7.56	0.2720	63149.	49847.	13302.	43.8	7.57	0.2240
7.96	0.2715	63193.	49987.	13206.	43.9	7.57	0.2245
8.36	0.2712	63221.	50098.	13123.	43.9	7.58	0.2249
8.76	0.2709	63249.	50187.	13062.	44.0	7.58	0.2252
9.16	0.2703	63267.	50266.	13001.	44.1	7.59	0.2258
9.56	0.2699	63243.	50308.	12935.	44.2	7.58	0.2262
9.96	0.2698	63302.	50381.	12921.	44.2	7.59	0.2264

DELTA T = 2.50, PRINTING EVERY 10 STEPS

34.96	0.2607	63196.	51339.	11856.	46.1	7.58	0.2358
59.96	0.2563	63124.	51511.	11614.	47.0	7.56	0.2404
84.96	0.2517	63076.	51568.	11508.	47.9	7.55	0.2450
109.96	0.2501	63065.	51565.	11501.	48.2	7.56	0.2466
134.96	0.2478	63053.	51571.	11482.	48.6	7.56	0.2490
159.96	0.2456	63041.	51590.	11450.	49.1	7.56	0.2511
184.96	0.2440	63034.	51564.	11470.	49.4	7.56	0.2527
209.96	0.2423	63044.	51549.	11495.	49.7	7.55	0.2544
234.96	0.2401	63034.	51463.	11571.	50.1	7.55	0.2565
259.96	0.2389	63025.	51530.	11496.	50.4	7.57	0.2577
284.96	0.2372	63025.	51539.	11486.	50.7	7.55	0.2594
309.96	0.2365	63025.	51566.	11459.	50.8	7.55	0.2601
334.96	0.2346	63031.	51552.	11479.	51.2	7.56	0.2620
359.96	0.2331	63034.	51565.	11469.	51.5	7.56	0.2634
384.96	0.2318	63025.	51571.	11454.	51.7	7.57	0.2646
409.96	0.2307	63025.	51584.	11441.	51.9	7.57	0.2657
434.96	0.2295	63034.	51600.	11435.	52.1	7.57	0.2668
459.96	0.2285	63028.	51606.	11422.	52.3	7.57	0.2677
484.96	0.2272	63022.	51622.	11400.	52.6	7.57	0.2690
509.96	0.2260	63016.	51638.	11378.	52.8	7.59	0.2701
534.96	0.2250	63013.	51644.	11368.	53.0	7.58	0.2710
559.96	0.2242	62990.	51676.	11314.	53.1	7.58	0.2718
584.96	0.2230	62994.	51667.	11327.	53.3	7.56	0.2729
609.96	0.2219	62978.	51689.	11289.	53.5	7.56	0.2748
634.96	0.2209	62966.	51695.	11271.	53.7	7.58	0.2749

M3065.022



RHEOLOGY DATA FOR FILE
M3065.023

INITIAL HEIGHT OF BED 194.3 MM
MASS OF PROPELLANT 0.8761 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTAT = 0.04. PRINTING EVERY STEP

0.00	0.4318	237.	258.	-21.	0.0	8.00	0.0300
0.04	0.4318	241.	271.	-30.	-0.0	8.00	-0.0200
0.08	0.4318	231.	259.	-28.	-0.0	8.00	-0.0201
0.12	0.4318	237.	252.	-14.	-0.0	7.61	-0.0001
0.16	0.4318	265.	277.	-12.	-0.0	5.55	-0.0000
0.20	0.4313	657.	465.	192.	0.2	5.98	0.0009
0.24	0.4208	2012.	1392.	620.	1.0	6.02	0.0052
0.28	0.4215	5438.	4022.	1416.	3.5	6.13	0.0178
0.32	0.4115	12469.	9193.	3276.	6.7	6.36	0.0344
0.36	0.3998	20455.	15149.	5305.	10.6	6.56	0.0546
0.40	0.3857	23986.	17981.	6085.	14.6	6.60	0.0750
0.44	0.3727	26890.	19812.	7078.	18.3	6.68	0.0941
0.48	0.3584	30869.	22872.	8797.	22.2	6.81	0.1143
0.52	0.3464	35493.	24977.	10517.	25.4	6.95	0.1307
0.56	0.3349	39751.	27926.	11825.	28.3	7.09	0.1457
0.60	0.3239	45913.	31644.	14269.	31.0	7.25	0.1596
0.64	0.3144	47649.	31920.	15729.	33.3	7.32	0.1712
0.68	0.3056	51850.	35180.	16670.	35.3	7.39	0.1817
0.72	0.2998	57814.	37898.	19916.	36.8	7.73	0.1895
0.76	0.2950	62307.	40441.	21066.	37.7	7.91	0.1940
0.80	0.2935	62521.	41094.	21426.	38.0	7.84	0.1958
0.84	0.2925	62588.	41246.	21342.	38.3	7.86	0.1969
0.88	0.2924	62570.	41297.	21273.	38.3	7.85	0.1970
0.92	0.2918	62613.	41332.	21281.	38.4	7.86	0.1977
0.96	0.2917	62630.	41345.	21285.	38.4	7.85	0.1978
1.00	0.2913	62654.	41363.	21290.	38.5	7.87	0.1982
1.04	0.2910	62682.	41386.	21296.	38.6	7.87	0.1986
1.08	0.2908	62706.	41412.	21295.	38.6	7.88	0.1988
1.12	0.2907	62728.	41437.	21291.	38.7	7.88	0.1989

PRINTING EVERY 10 STEPS

1.16	0.2906	62756.	41459.	21297.	38.7	7.88	0.1990
1.56	0.2894	62942.	41624.	21318.	38.9	7.90	0.2004
1.96	0.2890	63082.	41761.	21321.	39.0	7.92	0.2008
2.36	0.2888	63213.	41913.	21380.	39.2	7.94	0.2019
2.76	0.2878	63318.	42059.	21258.	39.3	7.98	0.2021
3.16	0.2870	63433.	42132.	21300.	39.5	7.94	0.2031
3.56	0.2866	63489.	42263.	21227.	39.5	7.98	0.2035

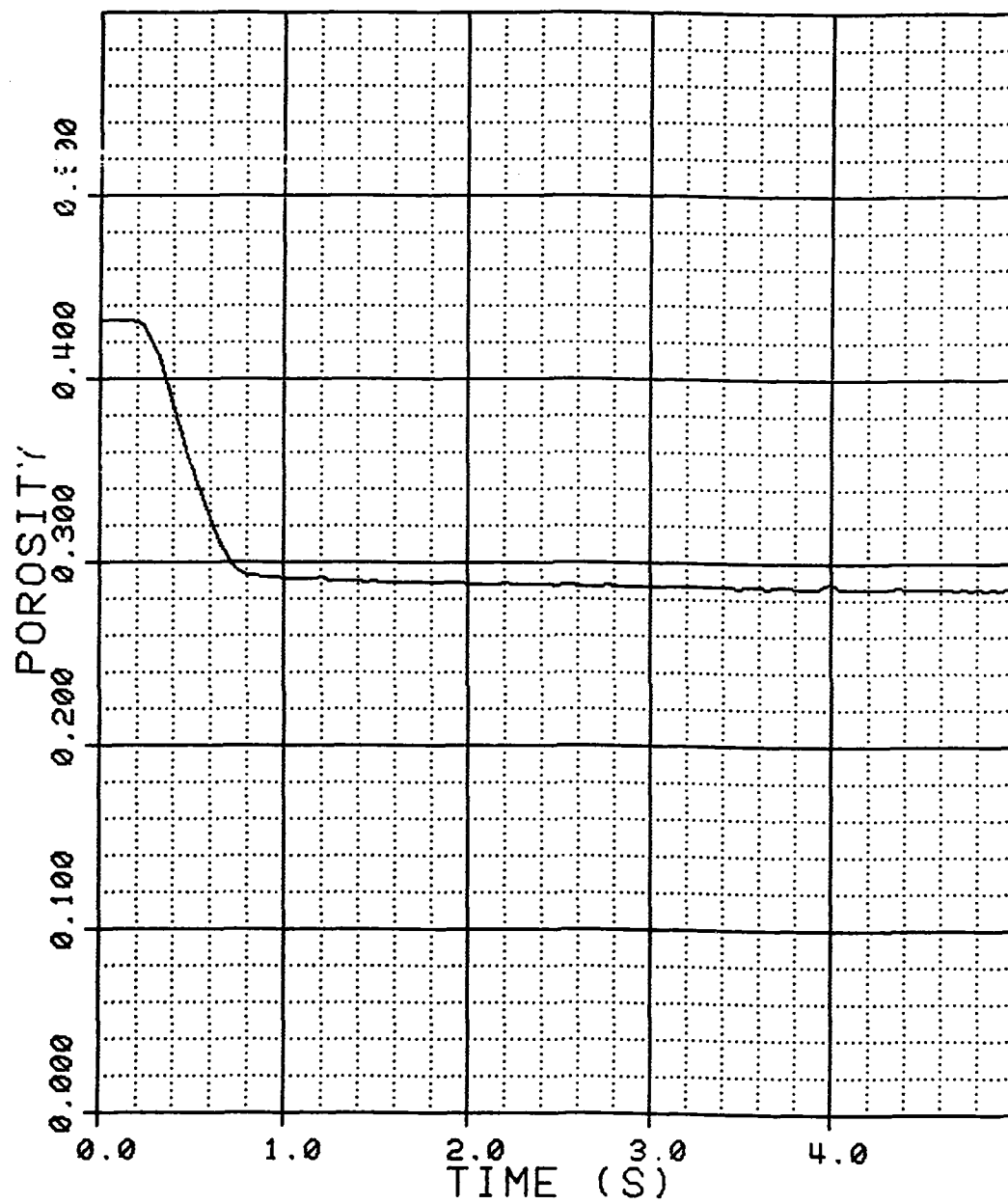
RHEOLOGY DATA FOR FILE
M3065.023

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.2885	63582.	42319.	21263.	39.1	7.94	0.2014
4.36	0.2865	63608.	42457.	21151.	39.6	8.00	0.2036
4.76	0.2845	63657.	42577.	21080.	40.0	8.01	0.2058
5.16	0.2849	63694.	42650.	21044.	39.9	8.01	0.2054
5.56	0.2853	63716.	42719.	20997.	39.8	8.01	0.2050
5.96	0.2851	63747.	42787.	20961.	39.9	8.01	0.2052
6.36	0.2851	63765.	42853.	20913.	39.9	8.02	0.2052
6.76	0.2848	63788.	42863.	20925.	39.9	8.01	0.2055
7.16	0.2851	63838.	42875.	20963.	39.9	8.00	0.2052
7.56	0.2844	63847.	42945.	20902.	40.0	8.01	0.2060
7.96	0.2835	63888.	42971.	20918.	40.2	8.02	0.2070
8.36	0.2838	63837.	42986.	20851.	40.1	7.98	0.2066
8.76	0.2838	63880.	43069.	20731.	40.2	8.02	0.2066
9.16	0.2836	63831.	43120.	20711.	40.2	8.02	0.2068
9.56	0.2834	63809.	43148.	20661.	40.2	8.02	0.2071
9.96	0.2833	63810.	43186.	20623.	40.3	8.02	0.2072

DELTAT = 2.50, PRINTING EVERY 10 STEPS

34.96	0.2794	63792.	44105.	19687.	41.1	8.02	0.2115
59.96	0.2774	63788.	44501.	19287.	41.5	8.02	0.2137
84.96	0.2759	63788.	44726.	19061.	41.8	8.05	0.2152
109.96	0.2748	63800.	44898.	18902.	42.1	8.04	0.2165
134.96	0.2736	63776.	45019.	18757.	42.3	8.03	0.2178
159.96	0.2728	63800.	45139.	18661.	42.5	8.04	0.2187
184.96	0.2718	63809.	45243.	18566.	42.7	8.06	0.2196
209.96	0.2710	63819.	45336.	18483.	42.9	8.06	0.2205
234.96	0.2699	63825.	45419.	18407.	43.1	8.06	0.2217
259.96	0.2694	63822.	45460.	18362.	43.2	8.07	0.2223
284.96	0.2689	63825.	45545.	18279.	43.3	8.07	0.2228
309.96	0.2668	63789.	45624.	18166.	43.7	8.05	0.2250
334.96	0.2676	63838.	45692.	18146.	43.5	8.06	0.2241
359.96	0.2669	63850.	45752.	18098.	43.7	8.05	0.2249
384.96	0.2662	63846.	45819.	18028.	43.8	8.05	0.2256
409.96	0.2657	63826.	45893.	17933.	43.9	8.06	0.2261
434.96	0.2652	63934.	45952.	17982.	44.1	8.05	0.2267
459.96	0.2644	63872.	46009.	17863.	44.2	8.04	0.2276
484.96	0.2641	63884.	46004.	17879.	44.3	8.00	0.2278
509.96	0.2635	63898.	46123.	17767.	44.4	8.05	0.2285
534.96	0.2630	63900.	46161.	17738.	44.5	8.05	0.2291
559.96	0.2623	63929.	46176.	17753.	44.6	8.05	0.2297
584.96	0.2619	63905.	46279.	17627.	44.7	8.07	0.2302
609.96	0.2614	63905.	46336.	17569.	44.8	8.08	0.2307
634.96	0.2609	63943.	46390.	17552.	44.9	8.08	0.2312

M3065.023



RHEOLOGY DATA FOR FILE
M3065.024

INITIAL HEIGHT OF BED 193.2 MM
MASS OF PROPELLANT 0.8766 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTAT = 0.04. PRINTING EVERY STEP

0.00	0.4283	208.	290.	-81.	0.0	7.95	0.0000
0.04	0.4282	211.	293.	-82.	0.0	7.95	0.0002
0.08	0.4284	215.	290.	-75.	-0.0	7.95	-0.0001
0.12	0.4283	215.	287.	-72.	-0.0	7.47	-0.0001
0.16	0.4277	784.	598.	185.	0.2	5.54	0.0010
0.20	0.4200	4771.	3364.	1408.	2.8	6.07	0.0143
0.24	0.4066	12019.	8621.	3398.	7.1	6.32	0.0366
0.28	0.3927	21215.	15458.	5757.	11.3	6.58	0.0586
0.32	0.3794	26376.	19159.	7217.	15.2	6.67	0.0788
0.36	0.3663	30546.	22101.	8445.	18.9	6.79	0.0978
0.40	0.3535	33104.	24295.	8808.	22.4	6.83	0.1157
0.44	0.3411	37262.	26635.	10627.	25.6	6.95	0.1323
0.48	0.3300	41949.	29356.	12593.	28.4	7.11	0.1467
0.52	0.3200	48414.	33849.	14565.	30.8	7.33	0.1593
0.56	0.3118	51645.	36525.	15120.	32.7	7.39	0.1693
0.60	0.3052	55756.	39049.	16708.	34.2	7.55	0.1772
0.64	0.3004	60148.	41433.	18715.	35.3	7.77	0.1829
0.68	0.2978	61912.	42792.	19121.	35.9	7.82	0.1859
0.72	0.2963	62238.	43191.	19047.	36.2	7.82	0.1876
0.76	0.2952	62294.	43302.	18992.	36.5	7.81	0.1888
0.80	0.2944	62474.	43455.	19020.	36.7	7.83	0.1898
0.84	0.2940	62369.	43508.	18861.	36.8	7.83	0.1902
0.88	0.2935	62353.	43543.	18810.	36.9	7.83	0.1907
0.92	0.2932	62372.	43581.	18790.	36.9	7.83	0.1912
0.96	0.2928	62356.	43594.	18762.	37.0	7.83	0.1916
1.00	0.2923	62431.	43636.	18795.	37.1	7.84	0.1922
1.04	0.2918	62434.	43670.	18763.	37.2	7.85	0.1927
1.08	0.2918	62462.	43702.	18760.	37.2	7.85	0.1927
1.12	0.2915	62490.	43724.	18766.	37.3	7.85	0.1931

PRINTING EVERY 10 STEPS

1.16	0.2913	62508.	43750.	18759.	37.4	7.86	0.1933
1.56	0.2891	62670.	43978.	18692.	37.8	7.88	0.1958
1.96	0.2878	62807.	44220.	18587.	38.1	7.89	0.1973
2.36	0.2868	62828.	44385.	18444.	38.3	7.90	0.1984
2.76	0.2859	62900.	44547.	18353.	38.5	7.92	0.1995
3.16	0.2853	62956.	44686.	18270.	38.7	7.92	0.2001
3.56	0.2839	63030.	44817.	18213.	39.0	7.95	0.2016

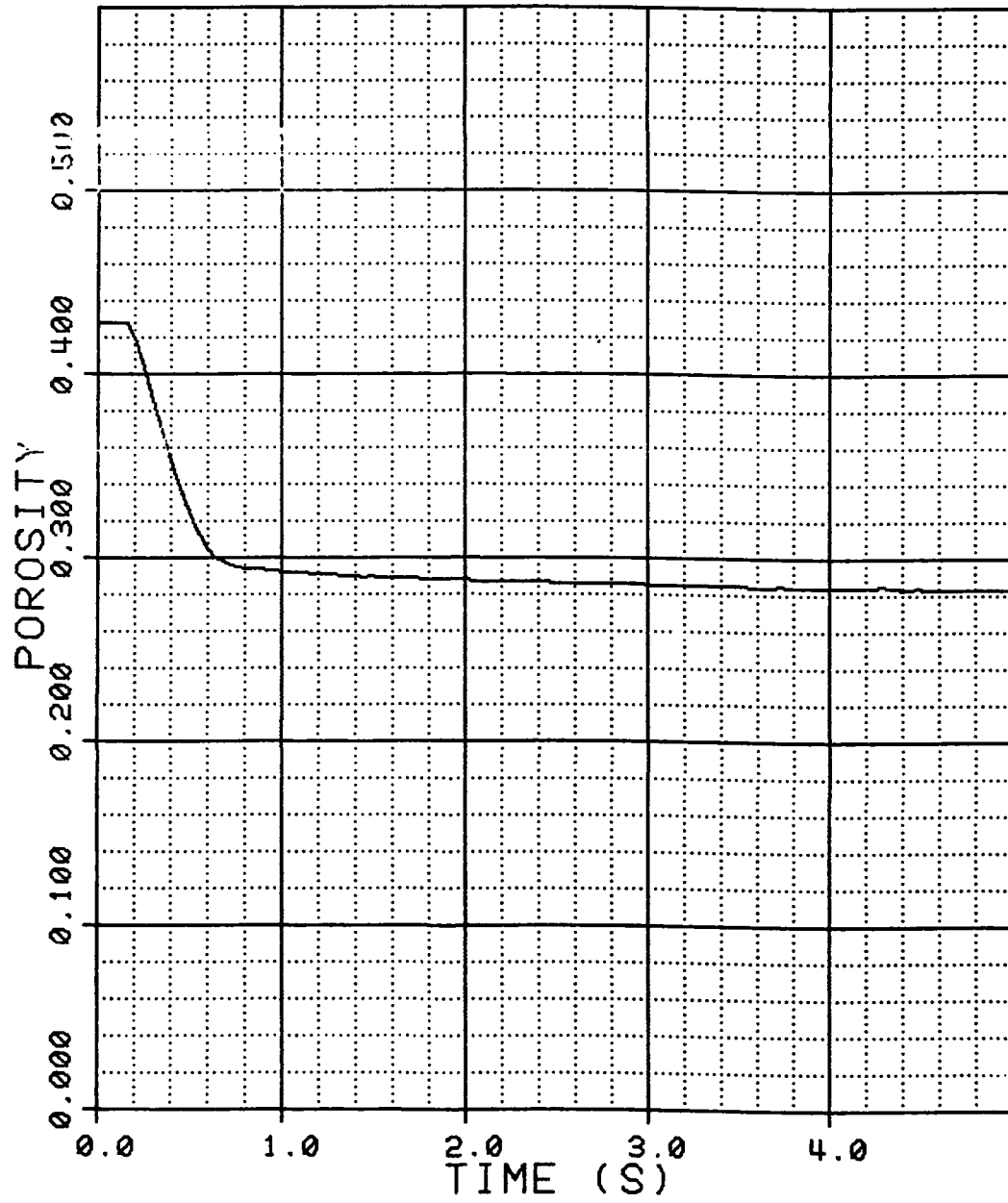
RHEOLOGY DATA FOR FILE
M3065.024

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.2840	63099.	44937.	18162.	38.9	7.94	0.2016
4.36	0.2835	63186.	45067.	18119.	39.0	7.95	0.2021
4.76	0.2830	63220.	45106.	18114.	39.2	7.96	0.2027
5.16	0.2826	63217.	45223.	17994.	39.2	7.95	0.2031
5.56	0.2822	63238.	45315.	17924.	39.3	7.96	0.2035
5.96	0.2818	63263.	45404.	17860.	39.4	7.96	0.2040
6.36	0.2815	63273.	45474.	17799.	39.5	7.96	0.2043
6.76	0.2811	63248.	45528.	17720.	39.6	7.96	0.2047
7.16	0.2809	63233.	45569.	17663.	39.6	7.96	0.2050
7.56	0.2807	63233.	45614.	17619.	39.6	7.96	0.2052
7.96	0.2807	63235.	45658.	17577.	39.7	7.96	0.2052
8.36	0.2802	63245.	45702.	17543.	39.8	7.96	0.2058
8.76	0.2798	63174.	45721.	17452.	39.8	7.96	0.2061
9.16	0.2796	63264.	45782.	17482.	39.9	7.97	0.2064
9.56	0.2798	63257.	45814.	17443.	39.8	7.97	0.2062
9.96	0.2793	63251.	45846.	17406.	39.9	7.97	0.2067

DELTAT = 2.50, PRINTING EVERY 10 STEPS

34.96	0.2715	63214.	46521.	16692.	41.6	7.95	0.2152
59.96	0.2686	63192.	46702.	16490.	42.2	7.95	0.2184
84.96	0.2659	63173.	46776.	16398.	42.8	7.95	0.2212
109.96	0.2635	63167.	46753.	16414.	43.2	7.96	0.2238
134.96	0.2617	63167.	46724.	16443.	43.6	7.95	0.2256
159.96	0.2599	63161.	46697.	16464.	44.0	7.95	0.2276
184.96	0.2589	63155.	46642.	16513.	44.2	7.94	0.2286
209.96	0.2568	63124.	46598.	16526.	44.6	7.95	0.2308
234.96	0.2555	63136.	46575.	16561.	44.8	7.97	0.2321
259.96	0.2542	63133.	46547.	16586.	45.1	7.96	0.2335
284.96	0.2525	63108.	46509.	16599.	45.5	7.96	0.2352
309.96	0.2515	63100.	46477.	16631.	45.6	7.95	0.2362
334.96	0.2504	63189.	46509.	16680.	45.9	7.94	0.2373
359.96	0.2491	63173.	46499.	16674.	46.1	7.95	0.2386
384.96	0.2480	63195.	46509.	16686.	46.3	7.97	0.2398
409.96	0.2471	63192.	46515.	16677.	46.5	7.97	0.2407
434.96	0.2459	63208.	46525.	16683.	46.7	7.96	0.2419
459.96	0.2445	63192.	46544.	16647.	47.0	7.95	0.2432
484.96	0.2433	63191.	46567.	16624.	47.2	7.96	0.2445
509.96	0.2426	63214.	46566.	16648.	47.4	7.95	0.2451
534.96	0.2415	63205.	46563.	16642.	47.6	7.94	0.2463
559.96	0.2407	63171.	46575.	16595.	47.7	7.95	0.2471
584.96	0.2398	63133.	46566.	16567.	47.9	7.95	0.2480
609.96	0.2389	63085.	46552.	16533.	48.1	7.96	0.2488
634.96	0.2379	63055.	46547.	16508.	48.3	7.95	0.2499

M3065.024



RHEOLOGY DATA FOR FILE
M3070.025

INITIAL HEIGHT OF BED 203.4 MM
MASS OF PROPELLANT 0.8755 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTAT = 0.04, PRINTING EVERY STEP

0.00	0.4574	104.	126.	-21.	0.0	2.17	0.0000
0.04	0.4575	95.	132.	-37.	-0.0	2.17	-0.0002
0.08	0.4574	98.	132.	-34.	0.0	2.17	0.0001
0.12	0.4574	101.	129.	-28.	0.0	1.18	0.0001
0.16	0.4574	123.	138.	-16.	-0.0	1.49	-0.0000
0.20	0.4573	182.	151.	31.	0.1	1.56	0.0003
0.24	0.4569	418.	227.	191.	0.2	1.55	0.0009
0.28	0.4556	713.	348.	366.	0.7	1.57	0.0034
0.32	0.4543	1074.	504.	570.	1.2	1.56	0.0058
0.36	0.4523	1546.	704.	843.	1.9	1.58	0.0094
0.40	0.4497	2155.	957.	1190.	2.8	1.59	0.0140
0.44	0.4468	2923.	1291.	1632.	3.9	1.61	0.0191
0.48	0.4431	3862.	1713.	2149.	5.2	1.65	0.0258
0.52	0.4392	4962.	2157.	2805.	6.6	1.68	0.0324
0.56	0.4350	6143.	2604.	3538.	8.1	1.72	0.0397
0.60	0.4308	7324.	3059.	4265.	9.5	1.76	0.0468
0.64	0.4268	8518.	3535.	4983.	10.9	1.80	0.0534
0.68	0.4229	9640.	4036.	5683.	12.2	1.83	0.0599
0.72	0.4191	10659.	4512.	6147.	13.4	1.87	0.0660
0.76	0.4157	11563.	4950.	6613.	14.5	1.90	0.0715
0.80	0.4126	12353.	5325.	7028.	15.5	1.93	0.0763
0.84	0.4098	13018.	5658.	7360.	16.4	1.95	0.0807
0.88	0.4070	13581.	5941.	7640.	17.3	1.97	0.0850
0.92	0.4047	14044.	6169.	7874.	18.0	1.99	0.0886
0.96	0.4026	14435.	6366.	8069.	18.7	2.00	0.0918
1.00	0.4007	14761.	6531.	8230.	19.2	2.02	0.0946
1.04	0.3990	15022.	6658.	8365.	19.8	2.04	0.0972
1.08	0.3974	15249.	6769.	8480.	20.3	2.05	0.0997
1.12	0.3958	15430.	6850.	8572.	20.7	2.06	0.1020

PRINTING EVERY 10 STEPS

1.16	0.3948	15585.	6937.	8648.	21.1	2.06	0.1035
1.56	0.3862	16222.	7293.	8930.	23.6	2.10	0.1160
1.96	0.3818	16278.	7325.	8954.	24.9	2.12	0.1224
2.36	0.3786	16340.	7353.	8987.	25.8	2.12	0.1269
2.76	0.3762	16390.	7366.	9024.	26.5	2.12	0.1303
3.16	0.3743	16418.	7369.	9049.	27.0	2.12	0.1328
3.56	0.3727	16446.	7375.	9071.	27.5	2.13	0.1351

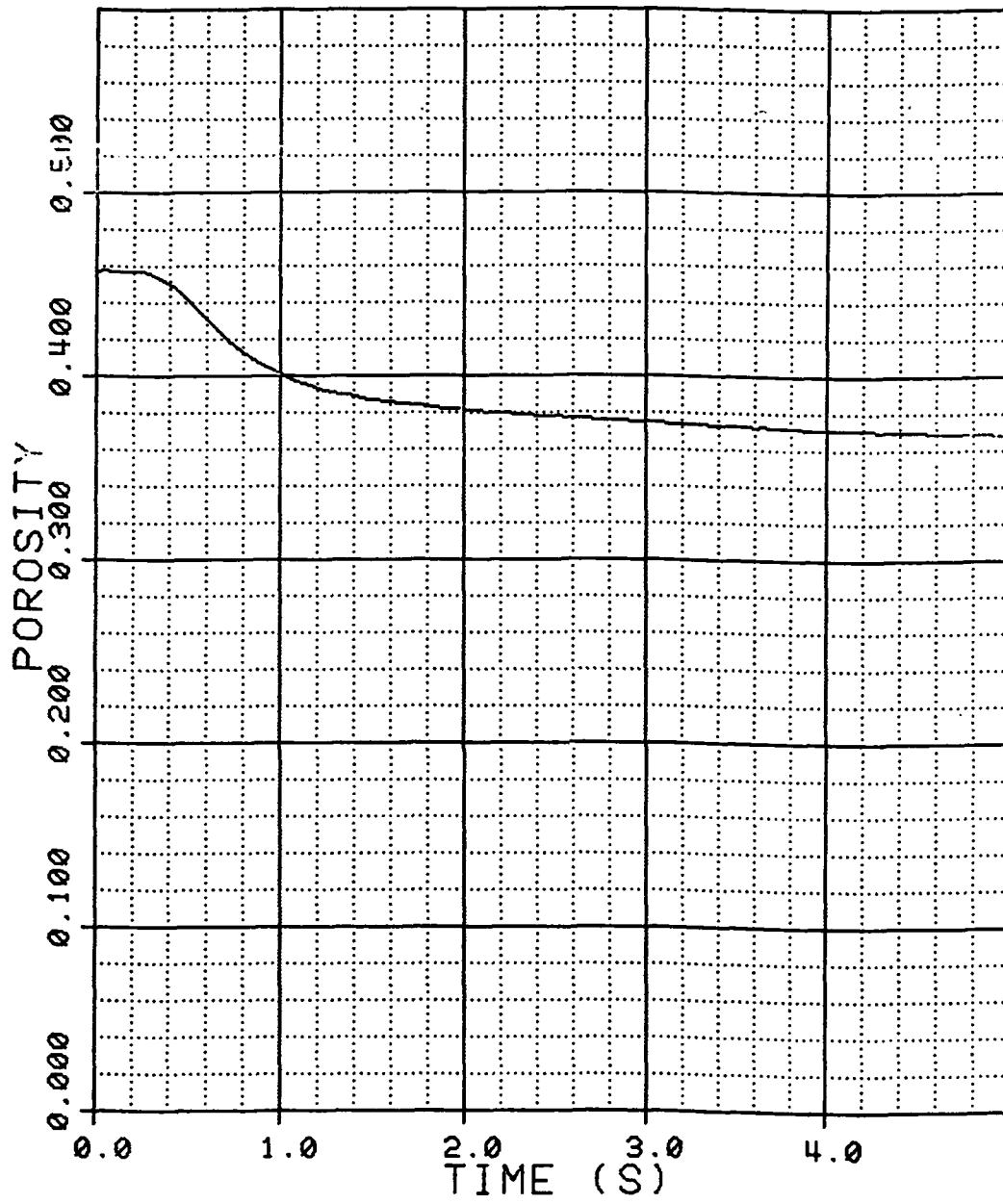
RHEOLOGY DATA FOR FILE
M3070.025

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.3712	16468.	7375.	9092.	27.9	2.12	0.1371
4.36	0.3701	16477.	7372.	9105.	28.2	2.13	0.1386
4.76	0.3690	16487.	7369.	9118.	28.5	2.13	0.1402
5.16	0.3680	16499.	7372.	9127.	28.8	2.13	0.1415
5.56	0.3671	16511.	7375.	9136.	29.0	2.13	0.1427
5.96	0.3663	16521.	7379.	9142.	29.3	2.13	0.1438
6.36	0.3655	16530.	7385.	9145.	29.5	2.14	0.1449
6.76	0.3648	16539.	7388.	9151.	29.7	2.13	0.1458
7.16	0.3642	16549.	7391.	9158.	29.8	2.13	0.1466
7.56	0.3637	16555.	7394.	9160.	30.0	2.15	0.1473
7.96	0.3629	16564.	7401.	9163.	30.2	2.15	0.1483
8.36	0.3625	16576.	7410.	9166.	30.3	2.14	0.1489
8.76	0.3618	16586.	7413.	9173.	30.5	2.14	0.1498
9.16	0.3614	16592.	7420.	9172.	30.6	2.15	0.1503
9.56	0.3611	16602.	7420.	9182.	30.7	2.14	0.1508
9.96	0.3605	16611.	7426.	9184.	30.8	2.14	0.1516

DELTAT = 1.00, PRINTING EVERY 10 STEPS

19.96	0.3541	16698.	7496.	9202.	32.5	2.15	0.1599
29.96	0.3496	16754.	7572.	9182.	33.7	2.12	0.1658
39.96	0.3469	16760.	7613.	9147.	34.4	2.11	0.1692
49.96	0.3446	16760.	7648.	9112.	35.0	2.09	0.1722
59.96	0.3430	16751.	7683.	9068.	35.4	2.11	0.1742
69.96	0.3417	16741.	7711.	9030.	35.8	2.15	0.1759
79.96	0.3405	16729.	7737.	8992.	36.1	2.13	0.1774
89.96	0.3392	16707.	7759.	8948.	36.4	2.15	0.1789
99.96	0.3383	16692.	7772.	8920.	36.6	2.14	0.1800
109.96	0.3373	16670.	7791.	8879.	36.9	2.13	0.1813
119.96	0.3365	16648.	7804.	8845.	37.1	2.10	0.1822
129.96	0.3358	16620.	7816.	8804.	37.2	2.13	0.1831
139.96	0.3354	16598.	7836.	8763.	37.3	2.13	0.1836
149.96	0.3346	16564.	7842.	8722.	37.5	2.11	0.1846
159.96	0.3340	16539.	7848.	8691.	37.7	2.11	0.1853
169.96	0.3335	16508.	7858.	8651.	37.8	2.10	0.1860
179.96	0.3330	16487.	7861.	8626.	37.9	2.09	0.1866
189.96	0.3323	16455.	7870.	8585.	38.1	2.08	0.1874
199.96	0.3320	16421.	7873.	8548.	38.2	2.09	0.1877
209.96	0.3320	16384.	7867.	8517.	38.2	2.09	0.1878
219.96	0.3313	16362.	7876.	8486.	38.3	2.10	0.1886
229.96	0.3309	16344.	7883.	8461.	38.5	2.08	0.1891
239.96	0.3304	16319.	7880.	8439.	38.6	2.10	0.1897
249.96	0.3300	16303.	7879.	8424.	38.5	2.10	0.1892
259.96	0.3301	16306.	7896.	8411.	38.7	2.09	0.1901

M3070.025



RHEOLOGY DATA FOR FILE
M30145.026

INITIAL HEIGHT OF BED 204.0 MM
MASS OF PROPELLANT 0.8756 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTAT = 0.04, PRINTING EVERY STEP

0.00	0.4590	153.	139.	15.	0.0	2.10	0.0000
0.04	0.4589	154.	139.	15.	0.0	2.11	0.0002
0.08	0.4589	153.	135.	18.	0.0	2.06	0.0002
0.12	0.4589	150.	135.	15.	0.0	1.13	0.0002
0.16	0.4589	157.	135.	21.	0.0	1.35	0.0002
0.20	0.4590	160.	139.	21.	0.0	1.36	0.0000
0.24	0.4589	169.	138.	31.	0.0	1.35	0.0002
0.28	0.4588	169.	142.	28.	0.1	1.34	0.0004
0.32	0.4589	178.	142.	37.	0.0	1.33	0.0002
0.36	0.4588	185.	142.	43.	0.1	1.32	0.0004
0.40	0.4589	191.	145.	46.	0.0	1.32	0.0002
0.44	0.4588	209.	145.	64.	0.1	1.31	0.0003
0.48	0.4588	247.	154.	93.	0.1	1.31	0.0005
0.52	0.4587	287.	167.	120.	0.1	1.31	0.0006
0.56	0.4583	324.	167.	157.	0.3	1.31	0.0013
0.60	0.4582	362.	183.	178.	0.3	1.31	0.0015
0.64	0.4580	405.	196.	210.	0.4	1.31	0.0018
0.68	0.4576	436.	215.	222.	0.5	1.31	0.0025
0.72	0.4575	480.	234.	246.	0.6	1.31	0.0028
0.76	0.4569	520.	256.	264.	0.8	1.31	0.0039
0.80	0.4566	573.	284.	288.	0.9	1.31	0.0045
0.84	0.4559	619.	313.	306.	1.2	1.31	0.0058
0.88	0.4552	675.	345.	331.	1.4	1.31	0.0070
0.92	0.4546	728.	370.	358.	1.6	1.31	0.0080
0.96	0.4538	794.	408.	386.	2.0	1.31	0.0096
1.00	0.4530	856.	446.	409.	2.2	1.31	0.0110
1.04	0.4520	924.	484.	440.	2.6	1.32	0.0128
1.08	0.4510	983.	525.	458.	3.0	1.32	0.0147
1.12	0.4498	1061.	574.	487.	3.4	1.32	0.0168

PRINTING EVERY 10 STEPS

1.16	0.4485	1136.	618.	518.	3.9	1.32	0.0191
1.56	0.4316	2133.	1192.	940.	9.8	1.35	0.0482
1.96	0.4052	4022.	2290.	1732.	18.4	1.42	0.0904
2.36	0.3695	7075.	4041.	3033.	29.0	1.52	0.1420
2.76	0.3313	10709.	6178.	4532.	38.9	1.68	0.1909
3.16	0.3024	13683.	7977.	5706.	45.8	1.84	0.2245
3.56	0.2847	15056.	8834.	6223.	49.7	1.93	0.2437

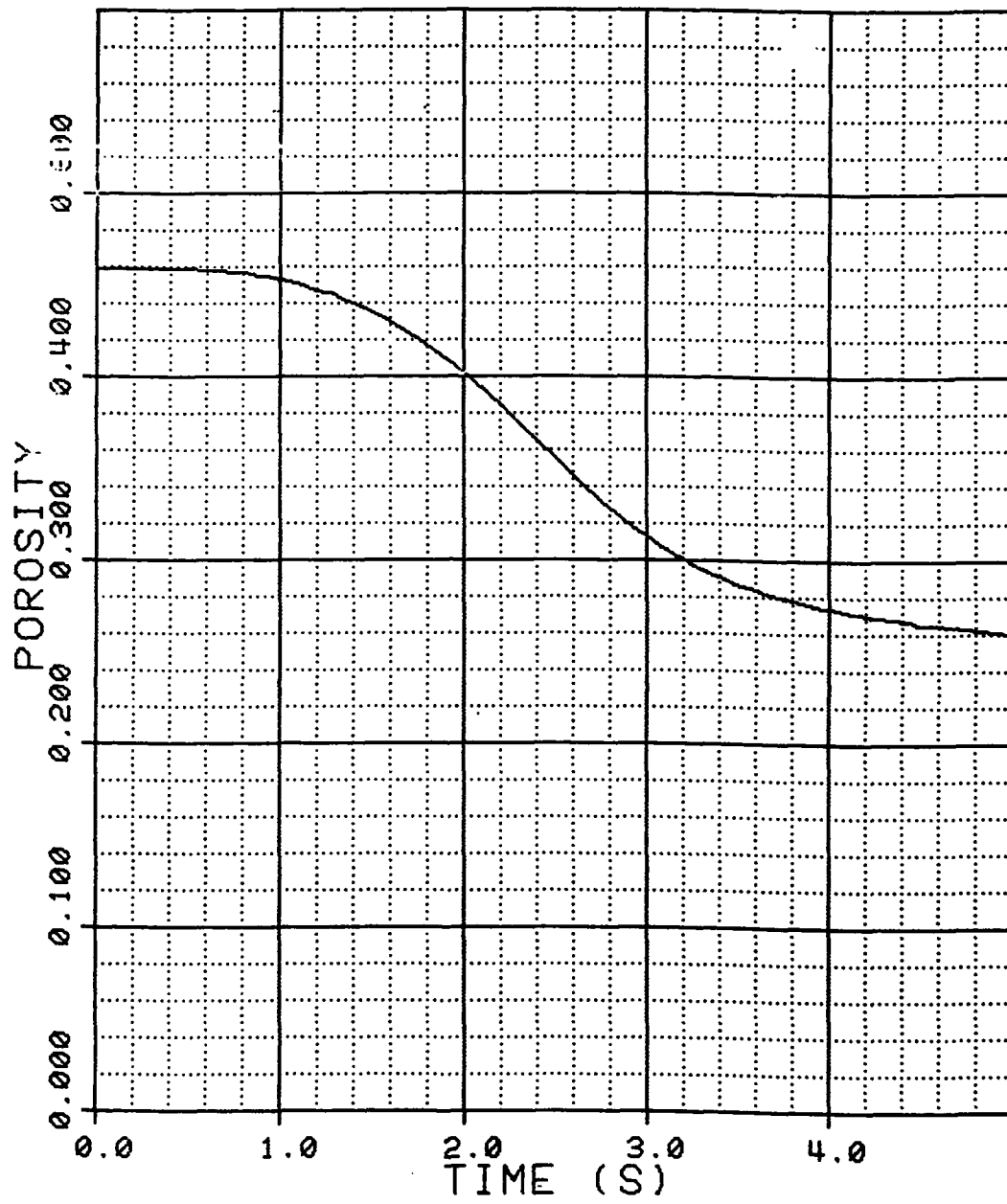
RHEOLOGY DATA FOR FILE
M30145.026

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.2743	15581.	9183.	6399.	51.9	1.97	0.2545
4.36	0.2676	15812.	9351.	6461.	53.3	1.99	0.2614
4.76	0.2627	15964.	9456.	6508.	54.3	2.00	0.2663
5.16	0.2585	16054.	9539.	6515.	55.2	2.01	0.2704
5.56	0.2556	16116.	9586.	6530.	55.7	2.01	0.2733
5.96	0.2531	16150.	9624.	6526.	56.2	2.02	0.2757
6.36	0.2510	16157.	9649.	6508.	56.7	2.03	0.2777
6.76	0.2492	16144.	9658.	6486.	57.0	2.03	0.2795
7.16	0.2477	16147.	9675.	6473.	57.3	2.03	0.2809
7.56	0.2462	16157.	9687.	6469.	57.6	2.03	0.2823
7.96	0.2449	16178.	9709.	6469.	57.8	2.03	0.2836
8.36	0.2432	16203.	9735.	6468.	58.2	2.03	0.2851
8.76	0.2426	16209.	9738.	6471.	58.3	2.03	0.2858
9.16	0.2417	16222.	9754.	6468.	58.5	2.03	0.2866
9.56	0.2406	16240.	9773.	6467.	58.7	2.03	0.2877
9.96	0.2399	16256.	9786.	6470.	58.8	2.03	0.2883

DELTAT = 1.00. PRINTING EVERY 10 STEPS

19.96	0.2278	16421.	9992.	6429.	61.1	2.06	0.2995
29.96	0.2211	16520.	10112.	6408.	62.3	2.05	0.3054
39.96	0.2169	16573.	10186.	6387.	63.1	2.07	0.3091
49.96	0.2135	16607.	10230.	6377.	63.7	2.07	0.3121
59.96	0.2113	16616.	10262.	6354.	64.1	2.08	0.3141
69.96	0.2093	16613.	10284.	6329.	64.4	2.08	0.3158
79.96	0.2077	16613.	10293.	6320.	64.7	2.07	0.3172
89.96	0.2066	16597.	10309.	6288.	64.9	2.07	0.3181
99.96	0.2054	16582.	10313.	6269.	65.1	2.07	0.3191
109.96	0.2043	16563.	10316.	6248.	65.3	2.07	0.3201
119.96	0.2034	16538.	10316.	6223.	65.5	2.07	0.3209
129.96	0.2028	16520.	10312.	6208.	65.6	2.07	0.3214
139.96	0.2019	16492.	10309.	6183.	65.7	2.06	0.3221
149.96	0.2014	16476.	10303.	6174.	65.8	2.06	0.3226
159.96	0.2005	16449.	10296.	6152.	65.9	2.06	0.3233
169.96	0.2000	16424.	10290.	6134.	66.0	2.06	0.3238
179.96	0.1992	16405.	10281.	6124.	66.2	2.06	0.3244
189.96	0.1987	16377.	10274.	6103.	66.3	2.06	0.3249
199.96	0.1984	16368.	10271.	6096.	66.3	2.07	0.3251
209.96	0.1979	16358.	10262.	6097.	66.4	2.05	0.3255
219.96	0.1975	16352.	10255.	6097.	66.5	2.04	0.3259
229.96	0.1974	16352.	10262.	6090.	66.5	2.04	0.3260
239.96	0.1970	16349.	10265.	6085.	66.6	2.05	0.3263
249.96	0.1968	16349.	10262.	6088.	66.6	2.04	0.3265
259.96	0.1964	16349.	10268.	6081.	66.7	2.05	0.3268

M30145.026



RHEOLOGY DATA FOR FILE
M30145.027

INITIAL HEIGHT OF BED 202.0 MM
MASS OF PROPELLANT 0.8760 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTAT = 0.04. PRINTING EVERY STEP

0.00	0.4533	88.	83.	4.	0.0	2.13	0.0000
0.04	0.4540	92.	74.	17.	-0.3	2.12	-0.0013
0.08	0.4531	82.	71.	11.	0.1	2.09	0.0004
0.12	0.4537	104.	80.	23.	-0.1	1.15	-0.0006
0.16	0.4531	172.	100.	72.	0.1	1.40	0.0003
0.20	0.4497	536.	242.	293.	1.3	1.43	0.0066
0.24	0.4456	840.	366.	474.	2.8	1.41	0.0140
0.28	0.4397	1151.	500.	652.	4.9	1.44	0.0243
0.32	0.4339	1474.	636.	838.	6.9	1.43	0.0343
0.36	0.4279	1844.	795.	1049.	9.0	1.44	0.0444
0.40	0.4214	2214.	940.	1274.	11.1	1.45	0.0551
0.44	0.4154	2608.	1137.	1471.	13.1	1.45	0.0648
0.48	0.4094	3060.	1318.	1742.	15.0	1.44	0.0743
0.52	0.4027	3514.	1534.	1980.	17.1	1.48	0.0847
0.56	0.3967	3974.	1709.	2265.	19.0	1.47	0.0939
0.60	0.3900	4464.	1928.	2537.	21.0	1.50	0.1038
0.64	0.3839	4959.	2131.	2828.	22.7	1.51	0.1126
0.68	0.3765	5462.	2365.	3096.	24.9	1.56	0.1232
0.72	0.3711	5981.	2584.	3397.	26.4	1.55	0.1307
0.76	0.3649	6538.	2835.	3702.	28.1	1.57	0.1392
0.80	0.3584	7069.	3076.	3992.	29.9	1.60	0.1479
0.84	0.3522	7600.	3331.	4269.	31.5	1.62	0.1560
0.88	0.3456	8150.	3575.	4575.	33.2	1.66	0.1646
0.92	0.3410	8700.	3819.	4881.	34.4	1.65	0.1704
0.96	0.3349	9219.	4079.	5140.	35.9	1.69	0.1780
1.00	0.3290	9725.	4324.	5401.	37.4	1.72	0.1852
1.04	0.3248	10260.	4555.	5705.	38.4	1.72	0.1904
1.08	0.3190	10767.	4825.	5941.	39.8	1.74	0.1972
1.12	0.3139	11232.	5054.	6179.	41.0	1.78	0.2032

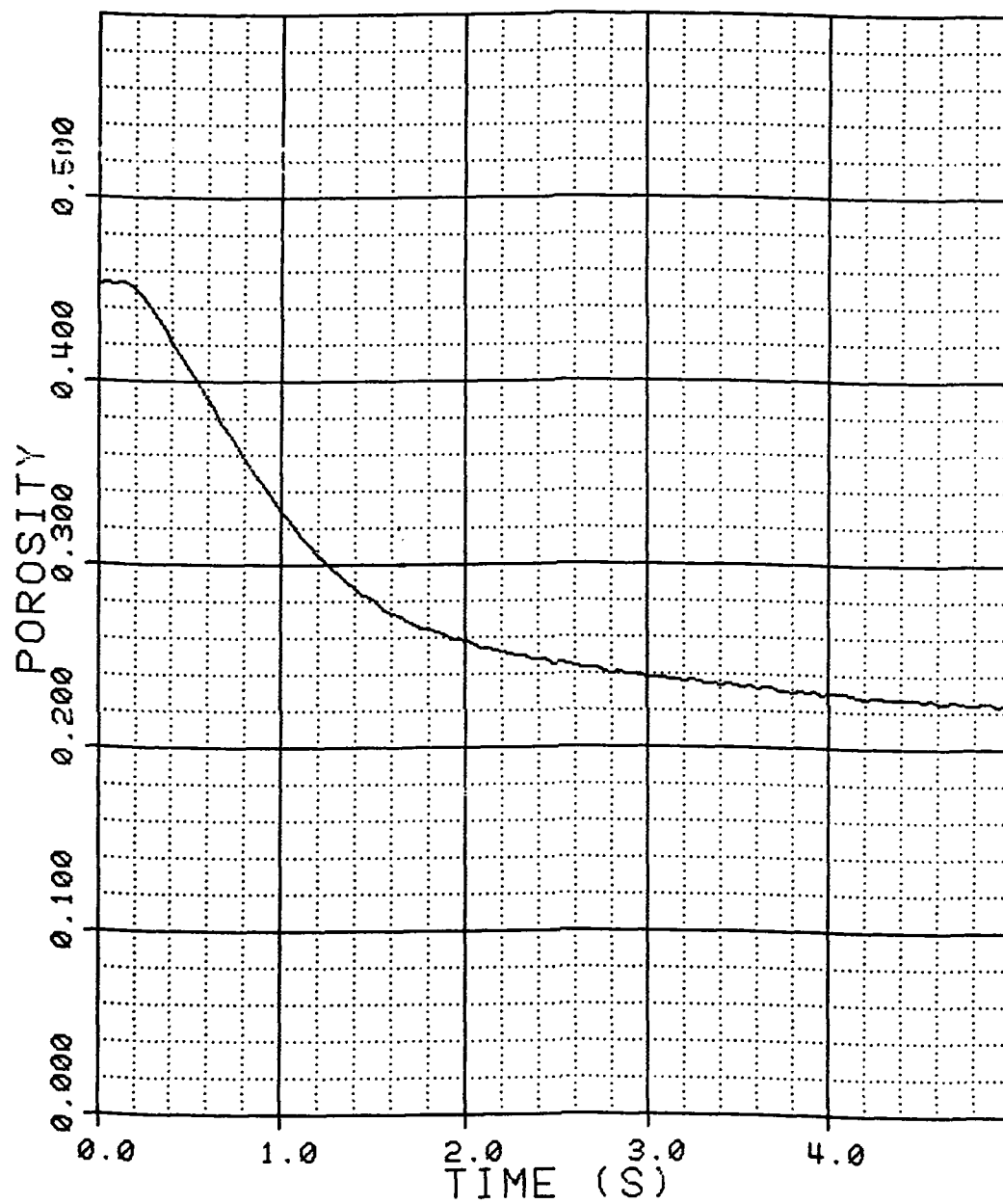
PRINTING EVERY 10 STEPS

1.16	0.3103	11708.	5266.	6442.	41.9	1.78	0.2074
1.56	0.2754	14828.	6834.	7994.	49.6	1.97	0.2456
1.96	0.2589	15861.	7425.	8436.	53.0	2.00	0.2623
2.36	0.2480	16201.	7729.	8473.	55.1	2.06	0.2730
2.76	0.2414	16364.	7878.	8486.	56.4	2.05	0.2793
3.16	0.2370	16466.	8027.	8439.	57.3	2.08	0.2835
3.56	0.2336	16513.	8110.	8403.	57.9	2.06	0.2866

RHEOLOGY DATA FOR FILE
M30145.027

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.2294	16543.	8224.	8319.	58.7	2.09	0.2905
4.36	0.2268	16565.	8288.	8278.	59.2	2.09	0.2929
4.76	0.2240	16600.	8351.	8248.	59.7	2.11	0.2955
5.16	0.2227	16616.	8386.	8230.	59.9	2.07	0.2967
5.56	0.2208	16619.	8433.	8185.	60.3	2.09	0.2984
5.96	0.2188	16630.	8506.	8124.	60.6	2.11	0.3002
6.36	0.2185	16675.	8534.	8140.	60.7	2.09	0.3005
6.76	0.2159	16671.	8589.	8082.	61.1	2.10	0.3028
7.16	0.2147	16693.	8620.	8072.	61.4	2.10	0.3038
7.56	0.2133	16677.	8652.	8025.	61.6	2.10	0.3051
7.96	0.2129	16699.	8672.	8028.	61.7	2.08	0.3054
8.36	0.2125	16696.	8687.	8009.	61.8	2.08	0.3058
8.76	0.2105	16696.	8722.	7974.	62.1	2.10	0.3075
9.16	0.2101	16724.	8757.	7967.	62.2	2.09	0.3079
9.56	0.2077	16715.	8770.	7945.	62.6	2.11	0.3100
9.96	0.2075	16708.	8805.	7903.	62.6	2.10	0.3102
DELTA T = 1.00, PRINTING EVERY 10 STEPS							
19.96	0.1945	16817.	9182.	7635.	64.9	2.13	0.3213
29.96	0.1867	16845.	9398.	7446.	66.2	2.13	0.3278
39.96	0.1811	16880.	9528.	7352.	67.1	2.13	0.3324
49.96	0.1790	16890.	9611.	7279.	67.5	2.09	0.3341
59.96	0.1760	16898.	9693.	7205.	68.0	2.10	0.3366
69.96	0.1721	16877.	9738.	7139.	68.6	2.11	0.3397
79.96	0.1700	16839.	9779.	7060.	68.9	2.12	0.3413
89.96	0.1691	16876.	9826.	7050.	69.1	2.11	0.3420
99.96	0.1678	16827.	9820.	7007.	69.3	2.08	0.3431
109.96	0.1670	16809.	9846.	6963.	69.4	2.09	0.3437
119.96	0.1644	16771.	9865.	6906.	69.8	2.11	0.3458
129.96	0.1637	16750.	9855.	6895.	69.9	2.10	0.3463
139.96	0.1630	16730.	9871.	6859.	69.9	2.09	0.3463
149.96	0.1631	16687.	9874.	6813.	70.0	2.08	0.3468
159.96	0.1625	16681.	9865.	6817.	70.1	2.06	0.3472
169.96	0.1602	16631.	9865.	6766.	70.5	2.09	0.3490
179.96	0.1599	16610.	9861.	6748.	70.5	2.07	0.3493
189.96	0.1601	16578.	9871.	6707.	70.5	2.09	0.3491
199.96	0.1587	16578.	9858.	6720.	70.7	2.07	0.3502
209.96	0.1586	16571.	9887.	6684.	70.7	2.08	0.3502
219.96	0.1580	16575.	9900.	6675.	70.8	2.09	0.3507
229.96	0.1575	16559.	9903.	6656.	70.9	2.09	0.3511
239.96	0.1573	16579.	9887.	6691.	70.9	2.06	0.3513
249.96	0.1575	16594.	9909.	6685.	70.9	2.08	0.3511
259.96	0.1562	16600.	9937.	6662.	71.1	2.09	0.3521

M30145.027



RHEOLOGY DATA FOR FILE
M30145.028

INITIAL HEIGHT OF BED 205.0 MM
MASS OF PROPELLANT 0.8773 KG

TIME	POROSITY	AVERAGE UPPER FORCE N	AVERAGE LOWER FORCE N	RESISTIVE FORCE N	AVERAGE DISTANCE MOVED MM	OIL PRESSURE MPA	STRAIN
S	-	N	N	N	MM	MPA	-
DELTAT = 0.04, PRINTING EVERY STEP							
0.00	0.4627	202.	67.	135.	0.0	4.17	0.0000
0.04	0.4626	199.	70.	129.	0.1	4.18	0.0003
0.08	0.4620	196.	64.	132.	-0.0	4.16	-0.0002
0.12	0.4620	364.	100.	256.	0.3	2.57	0.0013
0.16	0.4556	896.	362.	534.	2.7	2.99	0.0131
0.20	0.4459	1461.	622.	839.	6.2	3.03	0.0303
0.24	0.4358	2092.	889.	1204.	9.8	3.03	0.0478
0.28	0.4251	2838.	1223.	1616.	13.5	3.05	0.0655
0.32	0.4137	3656.	1578.	2078.	17.2	3.05	0.0837
0.36	0.4024	4542.	1971.	2570.	20.8	3.07	0.1009
0.40	0.3905	5542.	2426.	3117.	24.4	3.10	0.1184
0.44	0.3786	6627.	2911.	3716.	27.9	3.12	0.1354
0.48	0.3670	7796.	3426.	4370.	31.1	3.16	0.1512
0.52	0.3549	9039.	3975.	5064.	34.4	3.20	0.1672
0.56	0.3428	10369.	4562.	5807.	37.6	3.24	0.1825
0.60	0.3309	11777.	5187.	6590.	40.6	3.28	0.1971
0.64	0.3191	13241.	5831.	7410.	43.4	3.33	0.2109
0.68	0.3081	14742.	6498.	8244.	46.0	3.38	0.2235
0.72	0.2963	16263.	7164.	9098.	48.7	3.42	0.2365
0.76	0.2855	17761.	7828.	9933.	51.0	3.46	0.2480
0.80	0.2749	19262.	8472.	10790.	53.3	3.52	0.2590
0.84	0.2647	20757.	9107.	11650.	55.4	3.57	0.2693
0.88	0.2556	22177.	9713.	12464.	57.3	3.61	0.2783
0.92	0.2459	23526.	10288.	13238.	59.2	3.66	0.2875
0.96	0.2377	24779.	10824.	13954.	60.7	3.71	0.2952
1.00	0.2300	25904.	11291.	14613.	62.2	3.75	0.3022
1.04	0.2226	26911.	11713.	15198.	63.6	3.80	0.3089
1.08	0.2163	27790.	12081.	15709.	64.7	3.83	0.3144
1.12	0.2101	28561.	12395.	16166.	65.8	3.86	0.3199
PRINTING EVERY 10 STEPS							
1.16	0.2048	29214.	12668.	16545.	66.8	3.88	0.3244
1.56	0.1722	31868.	13928.	17940.	72.2	4.05	0.3510
1.96	0.1574	32396.	14366.	18030.	74.6	4.06	0.3624
2.36	0.1484	32629.	14684.	17945.	76.0	4.11	0.3691
2.76	0.1422	32751.	14916.	17835.	76.9	4.11	0.3737
3.16	0.1369	32835.	15115.	17719.	77.7	4.12	0.3775
3.56	0.1330	32912.	15306.	17606.	78.3	4.15	0.3803

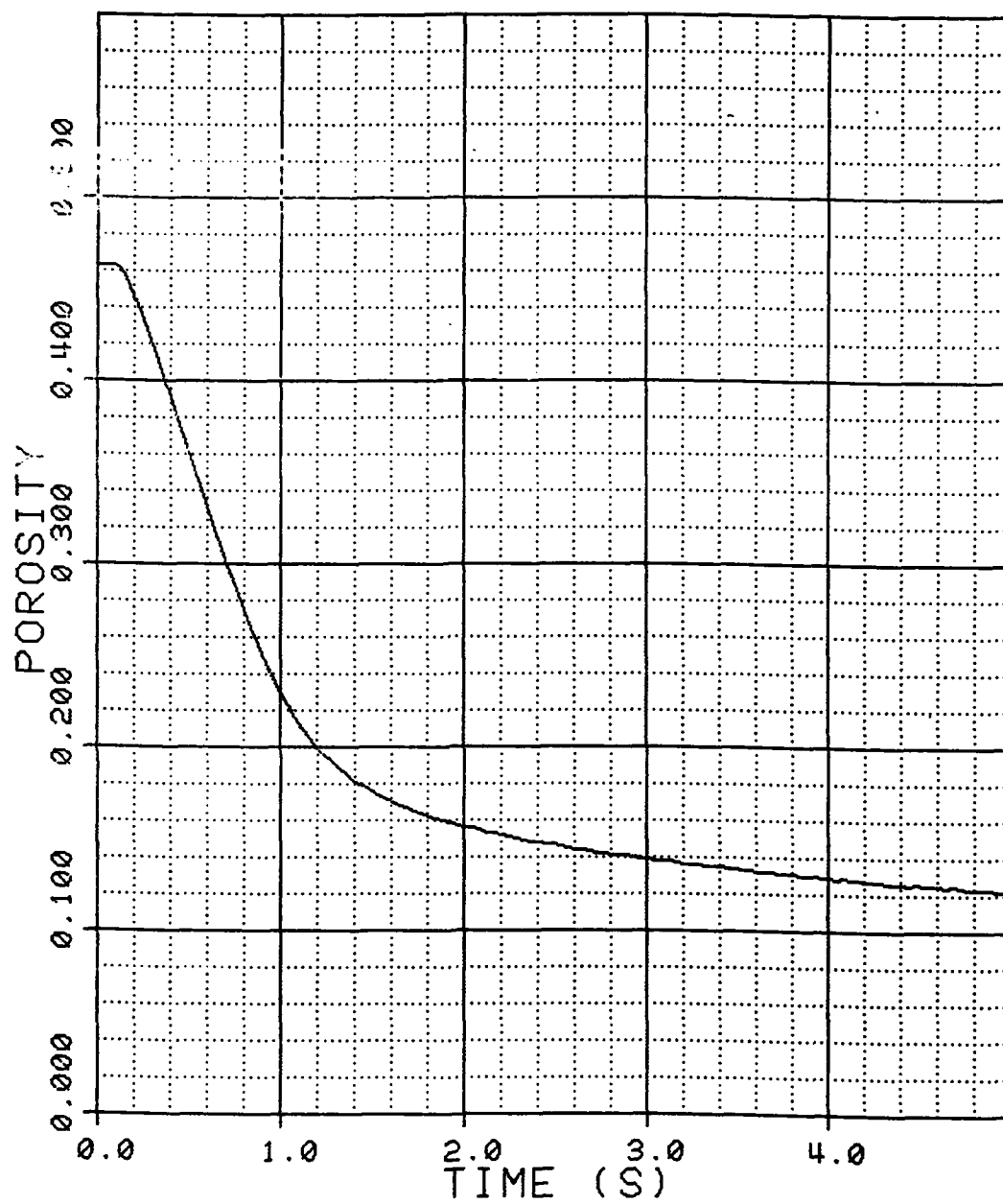
RHEOLOGY DATA FOR FILE
M30145.028

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.1295	32974.	15468.	17507.	78.8	4.13	0.3828
4.36	0.1264	33021.	15620.	17401.	79.2	4.15	0.3850
4.76	0.1235	33062.	15760.	17302.	79.6	4.15	0.3870
5.16	0.1209	33099.	15893.	17206.	80.0	4.17	0.3308
5.56	0.1191	33124.	16014.	17110.	80.3	4.15	0.3901
5.96	0.1171	33143.	16118.	17025.	80.6	4.15	0.3915
6.36	0.1151	33164.	16223.	16941.	80.8	4.14	0.3929
6.76	0.1137	33182.	16328.	16855.	81.0	4.17	0.3938
7.16	0.1117	33204.	16416.	16788.	81.3	4.15	0.3951
7.56	0.1105	33220.	16509.	16711.	81.5	4.18	0.3360
7.96	0.1092	33226.	16585.	16641.	81.7	4.17	0.3969
8.36	0.1080	33242.	16671.	16571.	81.8	4.18	0.3977
8.76	0.1069	33254.	16738.	16517.	82.0	4.16	0.3984
9.16	0.1057	33270.	16807.	16462.	82.1	4.17	0.3992
9.56	0.1045	33273.	16871.	16402.	82.3	4.17	0.4000
9.96	0.1033	33254.	16931.	16323.	82.5	4.18	0.4008

DELTAT = 1.00. PRINTING EVERY 10 STEPS

19.96	0.0882	33270.	17874.	15396.	84.5	4.20	0.4187
29.96	0.0788	33295.	18477.	14818.	85.8	4.20	0.4167
39.96	0.0731	33304.	18880.	14424.	86.5	4.17	0.4203
49.96	0.0686	33313.	19181.	14132.	87.1	4.17	0.4231
59.96	0.0650	33328.	19413.	13907.	87.5	4.18	0.4254
69.96	0.0622	33325.	19600.	13725.	87.9	4.18	0.4271
79.96	0.0599	33329.	19750.	13579.	88.2	4.18	0.4285
89.96	0.0578	33323.	19879.	13443.	88.4	4.20	0.4298
99.96	0.0552	33316.	20000.	13315.	88.8	4.19	0.4313
109.96	0.0537	33325.	20099.	13226.	89.0	4.20	0.4323
119.96	0.0534	33348.	20184.	13163.	89.0	4.16	0.4324
129.96	0.0504	33344.	20254.	13090.	89.4	4.20	0.4342
139.96	0.0518	33333.	20308.	13025.	89.2	4.18	0.4334
149.96	0.0497	33327.	20371.	12956.	89.4	4.20	0.4346
159.96	0.0487	33325.	20426.	12899.	89.6	4.18	0.4352
169.96	0.0475	33364.	20485.	12879.	89.7	4.19	0.4359
179.96	0.0465	33376.	20533.	12842.	89.8	4.18	0.4366
189.96	0.0458	33345.	20578.	12767.	90.0	4.20	0.4374
199.96	0.0459	33374.	20590.	12783.	89.9	4.19	0.4369
209.96	0.0441	33371.	20626.	12745.	90.1	4.18	0.4380
219.96	0.0427	33394	20673.	12721.	90.3	4.18	0.4387
229.96	0.0431	33413.	20686.	12727.	90.2	4.17	0.4385
239.96	0.0417	33419.	20727.	12692.	90.4	4.24	0.4394
249.96	0.0419	33435.	20749.	12686.	90.4	4.18	0.4392
259.96	0.0414	33435.	20774.	12660.	90.4	4.17	0.4395

M30145.028



RHEOLOGY DATA FOR FILE
M30145.029

INITIAL HEIGHT OF BED 211.3 MM
MASS OF PROPELLANT 0.8753 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTAT = 0.04, PRINTING EVERY STEP

0.00	0.4781	167.	136.	31.	0.0	6.18	0.0300
0.04	0.4783	177.	127.	50.	-0.1	6.13	-0.0304
0.08	0.4784	183.	130.	53.	-0.1	6.14	-0.0305
0.12	0.4785	183.	123.	60.	-0.2	4.02	-0.0008
0.16	0.4784	217.	130.	88.	-0.1	4.50	-0.0005
0.20	0.4773	540.	260.	280.	0.3	4.58	0.0015
0.24	0.4749	925.	425.	500.	1.3	4.56	0.0060
0.28	0.4715	1389.	663.	726.	2.6	4.52	0.0124
0.32	0.4651	1864.	898.	966.	5.1	4.52	0.0243
0.36	0.4566	2498.	1225.	1273.	8.4	4.52	0.0395
0.40	0.4472	3232.	1619.	1613.	11.8	4.52	0.0559
0.44	0.4362	4095.	2101.	1994.	15.7	4.56	0.0743
0.48	0.4247	5112.	2634.	2478.	19.6	4.58	0.0928
0.52	0.4125	6256.	3244.	3012.	23.6	4.63	0.1117
0.56	0.3984	7563.	3965.	3599.	20.0	4.68	0.1325
0.60	0.3853	9046.	4742.	4304.	31.9	4.69	0.1509
0.64	0.3711	10703.	5666.	5037.	35.9	4.72	0.1701
0.68	0.3559	12580.	6707.	5874.	40.1	4.77	0.1897
0.72	0.3415	14666.	7878.	6788.	43.8	4.82	0.2075
0.76	0.3262	16916.	9125.	7790.	47.6	4.89	0.2254
0.80	0.3110	19459.	10541.	8917.	51.2	4.97	0.2425
0.84	0.2966	22165.	12049.	10116.	54.5	5.06	0.2580
0.88	0.2804	24900.	13546.	11353.	58.1	5.16	0.2747
0.92	0.2672	27641.	14975.	12666.	60.8	5.23	0.2878
0.96	0.2526	30401.	16387.	14014.	63.8	5.33	0.3016
1.00	0.2410	33090.	17736.	15354.	66.0	5.38	0.3124
1.04	0.2291	35610.	19016.	16594.	68.3	5.46	0.3230
1.08	0.2186	37923.	20171.	17752.	70.2	5.52	0.3321
1.12	0.2100	39968.	21212.	18756.	71.7	5.61	0.3393

PRINTING EVERY 10 STEPS

1.16	0.1995	41686.	22066.	19620.	73.5	5.69	0.3480
1.56	0.1572	47535.	24988.	22547.	80.5	5.93	0.3807
1.96	0.1426	48253.	25338.	22915.	82.7	6.00	0.3913
2.36	0.1350	48396.	25465.	22931.	83.8	6.02	0.3967
2.76	0.1297	48592.	25611.	22981.	84.6	6.04	0.4003
3.16	0.1237	48738.	25763.	22975.	85.5	6.07	0.4044
3.56	0.1226	48868.	25887.	22982.	85.6	6.09	0.4052

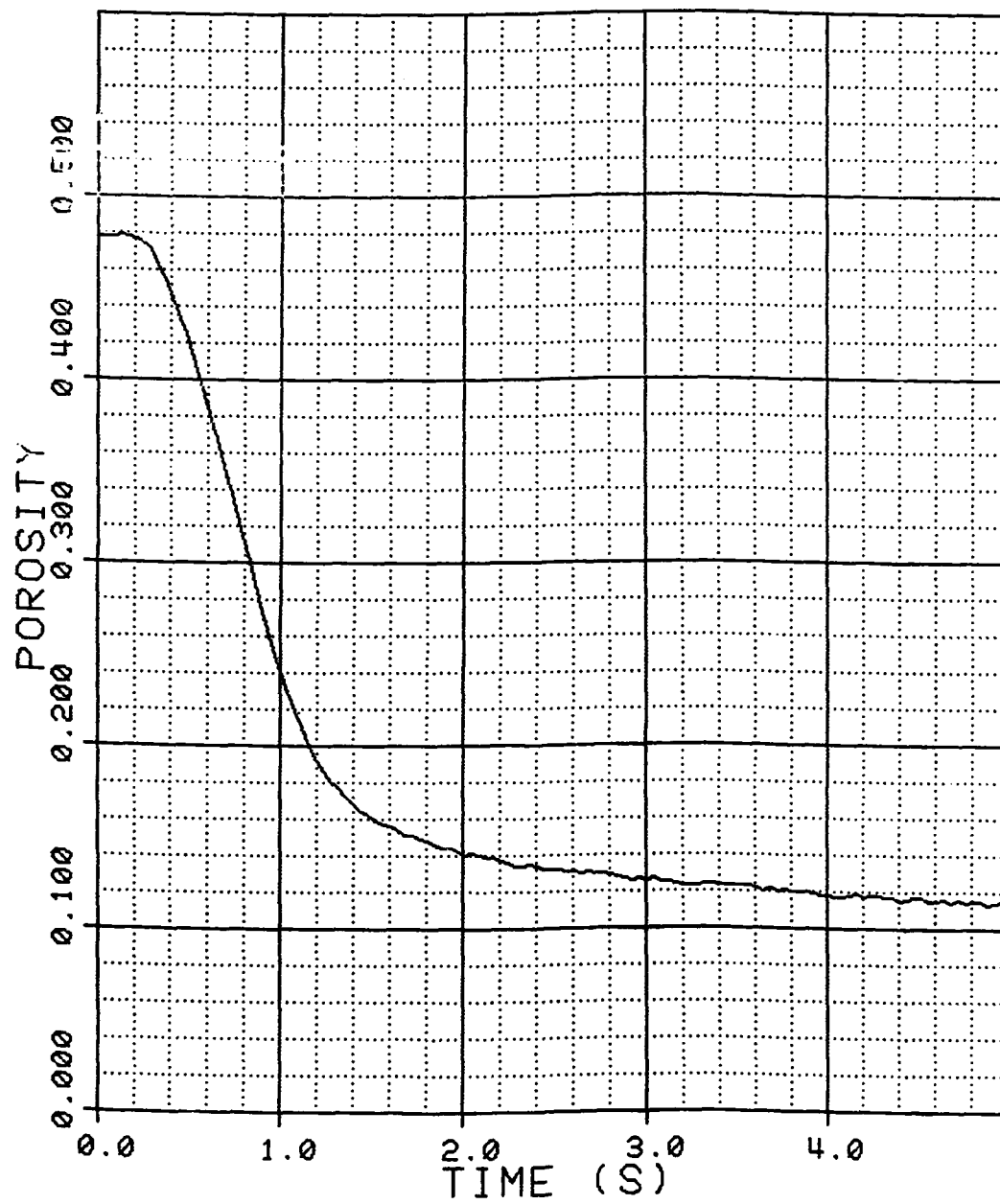
RHEOLOGY DATA FOR FILE
M30145.029

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.1181	48971.	26011.	22960.	86.3	6.10	0.4082
4.36	0.1167	49086.	26151.	22935.	86.5	6.09	0.4091
4.76	0.1144	49129.	26242.	22887.	86.8	6.08	0.4106
5.16	0.1117	49182.	26344.	22838.	87.2	6.15	0.4125
5.56	0.1102	49229.	26417.	22812.	87.4	6.15	0.4134
5.96	0.1102	49288.	26528.	22759.	87.4	6.16	0.4134
6.36	0.1080	49232.	26572.	22659.	87.7	6.16	0.4149
6.76	0.1072	49331.	26652.	22679.	87.8	6.11	0.4154
7.16	0.1052	49359.	26725.	22635.	88.1	6.16	0.4167
7.56	0.1051	49375.	26705.	22590.	88.1	6.14	0.4168
7.96	0.1030	49365.	26855.	22510.	88.4	6.14	0.4182
8.36	0.1023	49396.	26928.	22469.	88.5	6.19	0.4186
8.76	0.1021	49381.	26960.	22421.	88.5	6.13	0.4188
9.16	0.1004	49390.	27023.	22367.	88.7	6.15	0.4198
9.56	0.1017	49406.	27077.	22329.	88.6	6.14	0.4190
9.96	0.0990	49390.	27115.	22275.	88.9	6.14	0.4207

DELTAT = 1.00, PRINTING EVERY 10 STEPS

19.96	0.0899	49388.	27875.	21513.	90.1	6.15	0.4265
29.96	0.0830	49387.	28407.	20980.	91.1	6.18	0.4308
39.96	0.0808	49384.	28741.	20644.	91.3	6.15	0.4322
49.96	0.0773	49388.	29020.	20368.	91.8	6.14	0.4343
59.96	0.0739	49381.	29242.	20139.	92.2	6.14	0.4365
69.96	0.0736	49363.	29385.	19978.	92.3	6.17	0.4366
79.96	0.0700	49360.	29557.	19803.	92.7	6.17	0.4388
89.96	0.0687	49359.	29676.	19683.	92.9	6.10	0.4396
99.96	0.0681	49356.	29794.	19562.	93.0	6.14	0.4400
109.96	0.0671	49345.	29864.	19481.	93.1	6.11	0.4406
119.96	0.0663	49342.	29960.	19382.	93.2	6.12	0.4410
129.96	0.0650	49357.	30049.	19308.	93.3	6.16	0.4413
139.96	0.0641	49338.	30124.	19214.	93.5	6.17	0.4423
149.96	0.0627	49338.	30197.	19140.	93.7	6.08	0.4431
159.96	0.0633	49335.	30232.	19103.	93.6	6.11	0.4428
169.96	0.0620	49319.	30299.	19020.	93.8	6.10	0.4436
179.96	0.0617	49322.	30356.	18966.	93.8	6.17	0.4437
189.96	0.0606	49326.	30395.	18931.	93.9	6.18	0.4444
199.96	0.0599	49329.	30458.	18871.	94.0	6.09	0.4448
209.96	0.0602	49334.	30505.	18829.	94.0	6.11	0.4447
219.96	0.0603	49317.	30505.	18811.	94.0	6.12	0.4446
229.96	0.0597	49335.	30572.	18763.	94.0	6.12	0.4450
239.96	0.0588	49322.	30600.	18722.	94.2	6.14	0.4455
249.96	0.0589	49326.	30620.	18707.	94.1	6.14	0.4454
259.96	0.0595	49351.	30664.	18687.	94.1	6.11	0.4450

M30145.029



RHEOLOGY DATA FOR FILE
M30145.030

INITIAL HEIGHT OF BED 209.8 MM
MASS OF PROPELLANT 0.8757 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
DELTAT = 0.04, PRINTING EVERY STEP							
0.00	0.4741	112.	105.	8.	0.0	6.12	0.0300
0.04	0.4740	138.	118.	20.	0.0	6.10	0.0301
0.08	0.4741	138.	114.	24.	-0.0	6.09	-0.0001
0.12	0.4737	140.	124.	16.	0.1	4.02	0.0007
0.16	0.4735	191.	108.	83.	0.3	4.54	0.0013
0.20	0.4717	583.	280.	303.	1.0	4.54	0.0046
0.24	0.4675	961.	496.	466.	2.6	4.55	0.0123
0.28	0.4623	1400.	718.	682.	4.6	4.53	0.0219
0.32	0.4548	1906.	1016.	889.	7.4	4.56	0.0354
0.36	0.4467	2580.	1388.	1193.	10.4	4.57	0.0496
0.40	0.4379	3447.	1873.	1575.	13.5	4.60	0.0644
0.44	0.4273	4445.	2448.	1997.	17.2	4.59	0.0818
0.48	0.4161	5592.	3105.	2488.	20.9	4.64	0.0994
0.52	0.4048	6962.	3930.	3032.	24.4	4.66	0.1165
0.56	0.3923	8601.	4942.	3659.	28.2	4.71	0.1346
0.60	0.3807	10407.	5987.	4420.	31.7	4.73	0.1509
0.64	0.3664	12393.	7132.	5260.	35.7	4.84	0.1700
0.68	0.3541	14581.	8377.	6204.	39.0	4.88	0.1858
0.72	0.3403	16899.	9655.	7244.	42.6	4.95	0.2028
0.76	0.3280	19439.	11061.	8378.	45.6	5.01	0.2175
0.80	0.3153	22025.	12464.	9560.	48.7	5.08	0.2319
0.84	0.3017	24654.	13861.	10793.	51.8	5.16	0.2469
0.88	0.2899	27314.	15251.	12063.	54.4	5.24	0.2594
0.92	0.2771	29940.	16612.	13328.	57.2	5.34	0.2725
0.96	0.2660	32483.	17899.	14584.	59.5	5.43	0.2835
1.00	0.2559	34879.	19098.	15781.	61.5	5.50	0.2933
1.04	0.2479	37089.	20187.	16902.	63.1	5.54	0.3007
1.08	0.2385	39062.	21187.	17875.	64.9	5.62	0.3094
1.12	0.2309	40794.	22010.	18775.	66.4	5.66	0.3162

PRINTING EVERY 10 STEPS

1.16	0.2248	42264.	22694.	19570.	67.5	5.71	0.3216
1.56	0.1917	47106.	24659.	22447.	73.3	5.91	0.3494
1.96	0.1794	47736.	24792.	22944.	75.4	5.98	0.3592
2.36	0.1730	47964.	24801.	23162.	76.4	6.01	0.3641
2.76	0.1673	48050.	24801.	23249.	77.3	6.04	0.3685
3.16	0.1647	48226.	24862.	23363.	77.7	6.02	0.3704
3.56	0.1625	48353.	24903.	23449.	78.1	6.04	0.3721

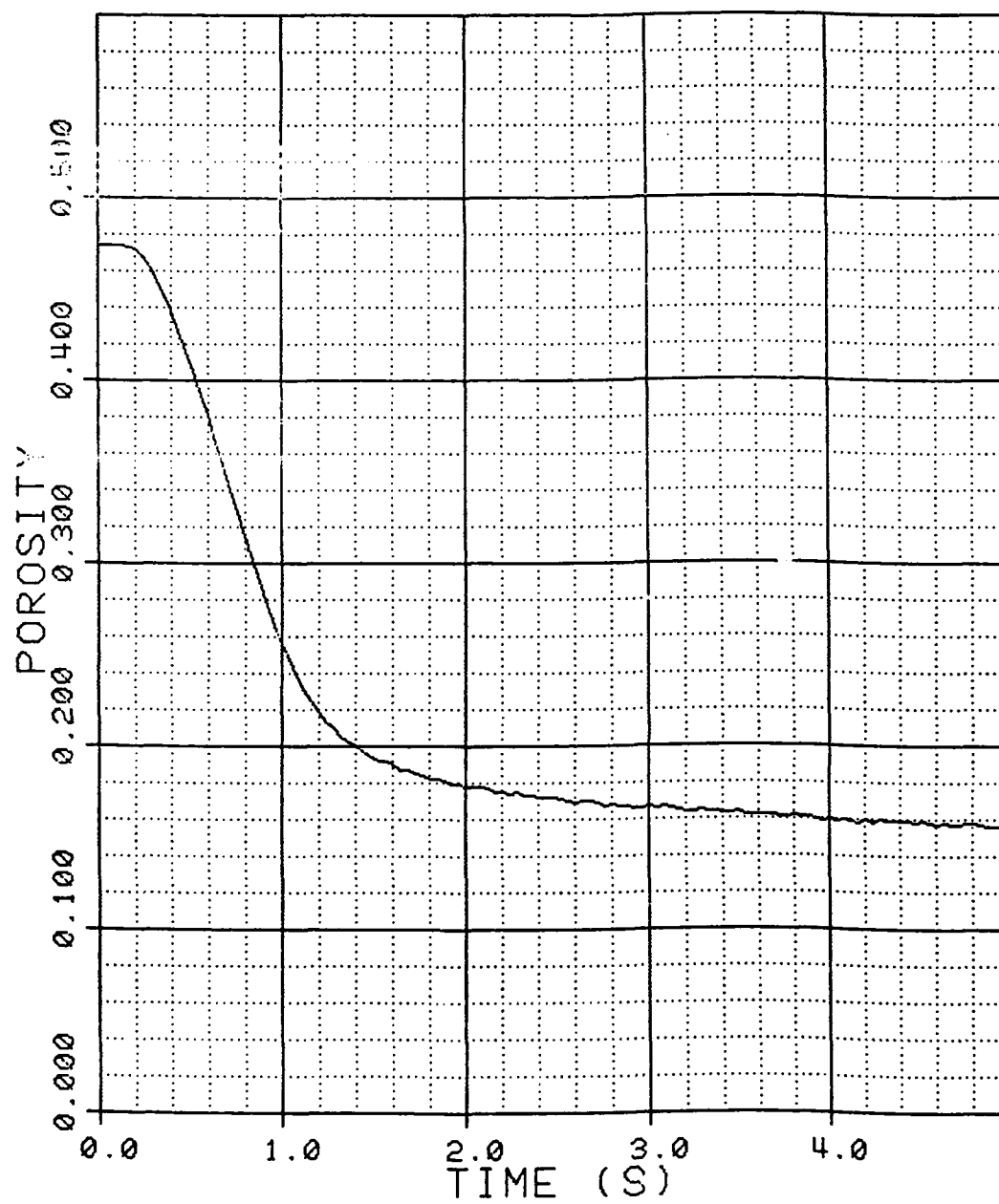
RHEOLOGY DATA FOR FILE
M30145.030

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.1594	48454.	24966.	23488.	78.6	6.08	0.3744
4.36	0.1591	48561.	25018.	23543.	78.6	6.08	0.3746
4.76	0.1577	48626.	25055.	23571.	78.8	6.07	0.3757
5.16	0.1550	48687.	25119.	23568.	79.3	6.11	0.3777
5.56	0.1549	48725.	25150.	23575.	79.3	6.10	0.3777
5.96	0.1526	48743.	25176.	23567.	79.6	6.11	0.3794
6.36	0.1518	48763.	25189.	23574.	79.7	6.10	0.3800
6.76	0.1514	48787.	25230.	23557.	79.8	6.11	0.3803
7.16	0.1499	48803.	25246.	23557.	80.0	6.10	0.3814
7.56	0.1493	48793.	25270.	23516.	80.1	6.13	0.3818
7.96	0.1483	48837.	25319.	23518.	80.3	6.10	0.3826
8.36	0.1481	48868.	25351.	23517.	80.3	6.12	0.3827
8.76	0.1480	48865.	25357.	23508.	80.3	6.11	0.3828
9.16	0.1461	48838.	25360.	23477.	80.6	6.11	0.3842
9.56	0.1467	48868.	25408.	23461.	80.5	6.10	0.3837
9.96	0.1457	48871.	25427.	23445.	80.7	6.11	0.3844

DELTAT = 1.00, PRINTING EVERY 10 STEPS

19.96	0.1364	48834.	25820.	23014.	82.1	6.12	0.3910
29.96	0.1321	48840.	26227.	22613.	82.7	6.11	0.3940
39.96	0.1286	48824.	26525.	22299.	83.2	6.15	0.3965
49.96	0.1274	48837.	26811.	22026.	83.4	6.11	0.3973
59.96	0.1255	48834.	27030.	21804.	83.7	6.11	0.3986
69.96	0.1223	48806.	27220.	21585.	84.1	6.11	0.4009
79.96	0.1213	48825.	27388.	21437.	84.3	6.09	0.4015
89.96	0.1197	48830.	27553.	21277.	84.5	6.11	0.4026
99.96	0.1182	48809.	27664.	21145.	84.7	6.11	0.4037
109.96	0.1176	48800.	27782.	21018.	84.8	6.11	0.4040
119.96	0.1166	48815.	27915.	20900.	84.9	6.10	0.4047
129.96	0.1171	48803.	28011.	20793.	84.9	6.14	0.4043
139.96	0.1160	48803.	28093.	20710.	85.0	6.12	0.4051
149.96	0.1156	48822.	28198.	20624.	85.1	6.13	0.4054
159.96	0.1149	48830.	28299.	20531.	85.2	6.17	0.4058
169.96	0.1143	48812.	28366.	20446.	85.2	6.17	0.4062
179.96	0.1135	48806.	28420.	20387.	85.4	6.12	0.4068
189.96	0.1128	48812.	28502.	20310.	85.5	6.10	0.4073
199.96	0.1128	48814.	28572.	20242.	85.5	6.14	0.4073
209.96	0.1128	48816.	28614.	20202.	85.5	6.10	0.4073
219.96	0.1127	48822.	28687.	20135.	85.5	6.13	0.4073
229.96	0.1117	48821.	28737.	20084.	85.6	6.14	0.4080
239.96	0.1114	48822.	28778.	20043.	85.7	6.12	0.4082
249.96	0.1117	48819.	28829.	19990.	85.6	6.10	0.4080
259.96	0.1117	48822.	28886.	19935.	85.6	6.14	0.4080

M30145.030



RHEOLOGY DATA FOR FILE
M3065.031

INITIAL HEIGHT OF BED 196.8 MM
MASS OF PROPELLANT 0.8778 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTAT = 0.04, PRINTING EVERY STEP

0.00	0.4378	117.	296.	-179.	0.0	2.13	0.0000
0.04	0.4376	123.	296.	-173.	0.1	2.14	0.0003
0.08	0.4376	123.	286.	-163.	0.1	2.03	0.0003
0.12	0.4376	127.	286.	-159.	0.0	1.04	0.0002
0.16	0.4378	137.	280.	-143.	-0.0	1.17	-0.0001
0.20	0.4377	135.	320.	-184.	0.0	1.19	0.0001
0.24	0.4376	145.	343.	-198.	0.0	1.18	0.0002
0.28	0.4376	148.	346.	-198.	0.0	1.17	0.0002
0.32	0.4375	157.	346.	-188.	0.1	1.17	0.0004
0.36	0.4378	173.	346.	-173.	-0.0	1.15	-0.0001
0.40	0.4377	179.	355.	-176.	0.0	1.16	0.0001
0.44	0.4375	189.	358.	-169.	0.1	1.15	0.0004
0.48	0.4375	201.	364.	-163.	0.1	1.15	0.0004
0.52	0.4376	207.	374.	-167.	0.1	1.15	0.0003
0.56	0.4375	220.	367.	-148.	0.1	1.15	0.0004
0.60	0.4376	226.	377.	-152.	0.0	1.15	0.0002
0.64	0.4375	244.	387.	-142.	0.1	1.15	0.0004
0.68	0.4375	272.	399.	-127.	0.1	1.15	0.0004
0.72	0.4374	304.	418.	-114.	0.1	1.15	0.0006
0.76	0.4373	341.	438.	-97.	0.1	1.16	0.0007
0.80	0.4374	375.	450.	-75.	0.1	1.16	0.0006
0.84	0.4372	418.	473.	-54.	0.2	1.15	0.0010
0.88	0.4372	453.	495.	-42.	0.2	1.16	0.0010
0.92	0.4370	493.	511.	-17.	0.2	1.16	0.0013
0.96	0.4369	540.	529.	10.	0.3	1.16	0.0015
1.00	0.4371	586.	558.	28.	0.2	1.16	0.0011
1.04	0.4368	633.	577.	56.	0.3	1.16	0.0017
1.08	0.4368	683.	616.	67.	0.4	1.16	0.0018
1.12	0.4366	745.	651.	93.	0.4	1.17	0.0021

PRINTING EVERY 10 STEPS

1.16	0.4365	801.	676.	125.	0.4	1.17	0.0022
1.56	0.4352	1680.	1220.	459.	0.9	1.21	0.0045
1.96	0.4317	3768.	2564.	1204.	2.1	1.30	0.0106
2.36	0.4225	8652.	5966.	2686.	5.2	1.56	0.0265
2.76	0.4157	14639.	9713.	4926.	7.4	1.94	0.0377
3.16	0.4114	16085.	11195.	4810.	8.8	2.04	0.0449
3.56	0.4107	16273.	11395.	4877.	9.0	2.06	0.0459

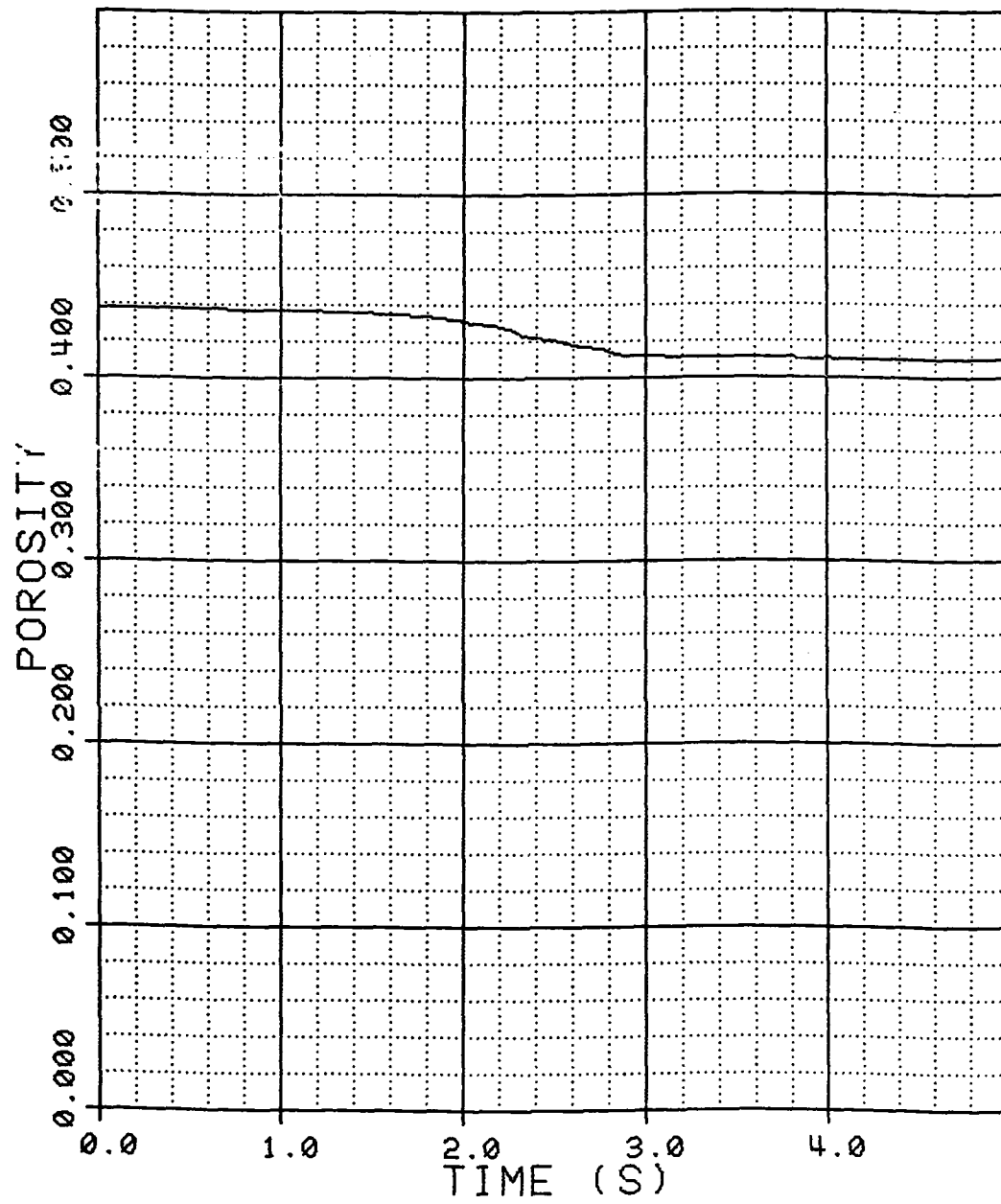
RHEOLOGY DATA FOR FILE
M3065.031

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.4103	16440.	11491.	4949.	9.1	2.08	0.0465
4.36	0.4102	16505.	11539.	4967.	9.2	2.08	0.0468
4.76	0.4099	16558.	11580.	4978.	9.3	2.09	0.0472
5.16	0.4098	16595.	11609.	4987.	9.3	2.10	0.0474
5.56	0.4097	16627.	11621.	5005.	9.4	2.10	0.0476
5.96	0.4095	16655.	11647.	5008.	9.4	2.10	0.0478
6.36	0.4095	16673.	11663.	5011.	9.4	2.10	0.0479
6.76	0.4093	16701.	11682.	5019.	9.5	2.10	0.0481
7.16	0.4092	16711.	11695.	5016.	9.5	2.10	0.0483
7.56	0.4091	16704.	11710.	4994.	9.5	2.10	0.0484
7.96	0.4091	16701.	11726.	4975.	9.6	2.10	0.0486
8.36	0.4090	16664.	11730.	4935.	9.6	2.11	0.0487
8.76	0.4089	16639.	11733.	4907.	9.6	2.11	0.0488
9.16	0.4088	16630.	11733.	4897.	9.6	2.11	0.0489
9.56	0.4088	16642.	11736.	4906.	9.6	2.11	0.0490
9.96	0.4086	16645.	11739.	4906.	9.7	2.11	0.0492

DELTAT = 1.00, PRINTING EVERY 10 STEPS

19.96	0.4080	16714.	11799.	4914.	9.9	2.12	0.0503
29.96	0.4076	16742.	11870.	4872.	10.0	2.13	0.0509
39.96	0.4073	16760.	12027.	4733.	10.1	2.12	0.0514
49.96	0.4070	16742.	12036.	4706.	10.2	2.13	0.0519
59.96	0.4067	16742.	12015.	4726.	10.3	2.13	0.0523
69.96	0.4067	16726.	12026.	4700.	10.3	2.13	0.0523
79.96	0.4066	16701.	11976.	4725.	10.3	2.12	0.0526
89.96	0.4065	16689.	11928.	4760.	10.4	2.12	0.0527
99.96	0.4064	16689.	11947.	4742.	10.4	2.12	0.0529
109.96	0.4062	16676.	11919.	4757.	10.4	2.13	0.0531
119.96	0.4062	16664.	11896.	4767.	10.5	2.13	0.0532
129.96	0.4060	16661.	11801.	4860.	10.5	2.12	0.0534
139.96	0.4060	16667.	11791.	4876.	10.5	2.12	0.0535
149.96	0.4059	16655.	11802.	4852.	10.6	2.12	0.0537
159.96	0.4058	16658.	11778.	4879.	10.6	2.12	0.0538
169.96	0.4058	16658.	11772.	4886.	10.6	2.12	0.0538
179.96	0.4058	16664.	11780.	4884.	10.6	2.11	0.0538
189.96	0.4055	16655.	11776.	4879.	10.7	2.12	0.0543
199.96	0.4054	16655.	11786.	4869.	10.7	2.11	0.0545
209.96	0.4054	16664.	11793.	4871.	10.7	2.12	0.0545
219.96	0.4057	16655.	11780.	4875.	10.6	2.11	0.0540
229.96	0.4053	16655.	11756.	4899.	10.8	2.11	0.0546
239.96	0.4048	16667.	11752.	4915.	10.9	2.12	0.0553
249.96	0.4050	16664.	11748.	4916.	10.8	2.12	0.0550
259.96	0.4050	16661.	11748.	4913.	10.8	2.12	0.0551

M3065.031



RHEOLOGY DATA FOR FILE
M3065.032

INITIAL HEIGHT OF BED 196.2 MM
MASS OF PROPELLANT 0.8778 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTA T = 0.04, PRINTING EVERY STEP

0.00	0.4363	82.	185.	-103.	0.0	2.13	0.0300
0.04	0.4363	81.	182.	-100.	-0.0	2.13	-0.0002
0.08	0.4362	81.	185.	-103.	0.0	2.07	0.0001
0.12	0.4362	78.	185.	-106.	0.0	1.01	0.0001
0.16	0.4363	81.	188.	-106.	-0.0	1.19	-0.0001
0.20	0.4362	116.	207.	-91.	0.0	1.20	0.0001
0.24	0.4360	364.	359.	5.	0.1	1.20	0.0005
0.28	0.4352	858.	645.	213.	0.4	1.22	0.0018
0.32	0.4338	1657.	1188.	469.	0.8	1.25	0.0043
0.36	0.4319	2847.	2115.	733.	1.5	1.30	0.0077
0.40	0.4289	4414.	3358.	1055.	2.5	1.38	0.0129
0.44	0.4258	6278.	4809.	1469.	3.6	1.47	0.0182
0.48	0.4226	8419.	6459.	1960.	4.7	1.58	0.0237
0.52	0.4196	10417.	8020.	2397.	5.6	1.68	0.0286
0.56	0.4173	12113.	9350.	2764.	6.4	1.78	0.0325
0.60	0.4150	13316.	10359.	2957.	7.1	1.84	0.0363
0.64	0.4136	14462.	11181.	3281.	7.6	1.92	0.0387
0.68	0.4122	15400.	11872.	3528.	8.0	1.99	0.0409
0.72	0.4114	15932.	12301.	3631.	8.3	2.03	0.0422
0.76	0.4110	16233.	12558.	3675.	8.4	2.05	0.0429
0.80	0.4104	16407.	12723.	3684.	8.6	2.05	0.0438
0.84	0.4102	16531.	12840.	3691.	8.7	2.07	0.0442
0.88	0.4099	16625.	12919.	3705.	8.8	2.07	0.0446
0.92	0.4096	16696.	12980.	3716.	8.9	2.08	0.0452
0.96	0.4096	16727.	13021.	3706.	8.9	2.08	0.0451
1.00	0.4092	16765.	13050.	3715.	9.0	2.09	0.0457
1.04	0.4092	16789.	13075.	3715.	9.0	2.09	0.0457
1.08	0.4090	16814.	13104.	3711.	9.0	2.09	0.0461
1.12	0.4086	16836.	13116.	3720.	9.2	2.09	0.0467

PRINTING EVERY 10 STEPS

1.16	0.4089	16857.	13138.	3719.	9.1	2.10	0.0463
1.56	0.4081	16945.	13214.	3730.	9.3	2.10	0.0475
1.96	0.4076	16968.	13170.	3790.	9.5	2.10	0.0483
2.36	0.4072	16991.	13234.	3758.	9.6	2.11	0.0490
2.76	0.4070	17000.	13243.	3757.	9.7	2.11	0.0494
3.16	0.4068	17004.	13256.	3748.	9.7	2.11	0.0496
3.56	0.4066	17010.	13266.	3744.	9.8	2.11	0.0500

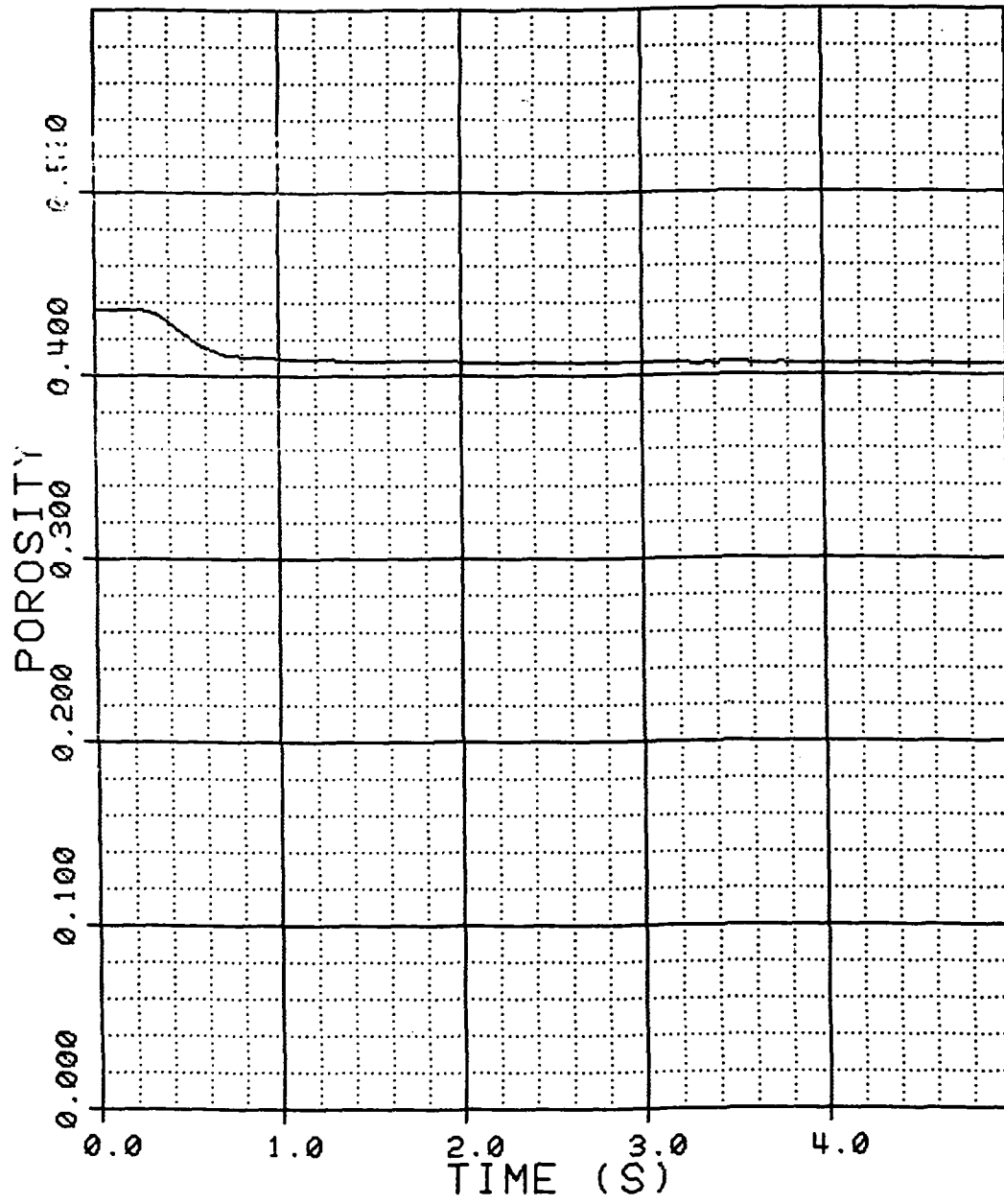
RHEOLOGY DATA FOR FILE
M3065.032

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.4064	17022.	13278.	3744.	9.9	2.11	0.0503
4.36	0.4063	17004.	13278.	3726.	9.9	2.11	0.0505
4.76	0.4061	16994.	13278.	3716.	10.0	2.11	0.0508
5.16	0.4060	17026.	13288.	3738.	10.0	2.11	0.0510
5.56	0.4058	17022.	13291.	3732.	10.1	2.11	0.0512
5.96	0.4057	17016.	13294.	3722.	10.1	2.11	0.0514
6.36	0.4057	17004.	13294.	3710.	10.1	2.12	0.0514
6.76	0.4056	16991.	13281.	3710.	10.1	2.14	0.0515
7.16	0.4054	16982.	13274.	3708.	10.2	2.15	0.0518
7.56	0.4055	16976.	13274.	3701.	10.2	2.14	0.0517
7.96	0.4054	16982.	13275.	3707.	10.2	2.12	0.0520
8.36	0.4054	16982.	13278.	3704.	10.2	2.11	0.0520
8.76	0.4052	16982.	13278.	3704.	10.2	2.11	0.0522
9.16	0.4052	16982.	13281.	3701.	10.2	2.12	0.0522
9.56	0.4052	16988.	13275.	3713.	10.3	2.12	0.0523
9.96	0.4050	16982.	13281.	3701.	10.3	2.12	0.0525

DELTAT = 1.00, PRINTING EVERY 10 STEPS

19.96	0.4041	16970.	13278.	3692.	10.6	2.15	0.0539
29.96	0.4036	16985.	13275.	3710.	10.8	2.15	0.0548
39.96	0.4030	17001.	13278.	3722.	10.9	2.15	0.0557
49.96	0.4027	16988.	13268.	3720.	11.0	2.16	0.0562
59.96	0.4023	16976.	13262.	3714.	11.1	2.15	0.0568
69.96	0.4020	16957.	13249.	3708.	11.2	2.15	0.0573
79.96	0.4017	16929.	13230.	3699.	11.3	2.15	0.0578
89.96	0.4016	16920.	13211.	3709.	11.4	2.15	0.0579
99.96	0.4015	16901.	13198.	3703.	11.4	2.15	0.0581
109.96	0.4012	16886.	13180.	3706.	11.5	2.15	0.0585
119.96	0.4009	16892.	13221.	3671.	11.6	2.15	0.0590
129.96	0.4007	16858.	13208.	3650.	11.6	2.14	0.0593
139.96	0.4005	16848.	13199.	3650.	11.7	2.14	0.0597
149.96	0.4004	16839.	13189.	3650.	11.7	2.13	0.0599
159.96	0.4003	16839.	13176.	3663.	11.8	2.14	0.0600
169.96	0.4000	16836.	13167.	3669.	11.8	2.13	0.0604
179.96	0.4000	16833.	13158.	3675.	11.8	2.15	0.0604
189.96	0.3998	16833.	13145.	3688.	11.9	2.14	0.0607
199.96	0.3998	16830.	13141.	3688.	11.9	2.14	0.0608
209.96	0.3998	16833.	13132.	3701.	11.9	2.14	0.0607
219.96	0.3996	16827.	13126.	3701.	12.0	2.13	0.0610
229.96	0.3995	16833.	13123.	3710.	12.0	2.14	0.0612
239.96	0.3993	16836.	13113.	3723.	12.1	2.14	0.0616
249.96	0.3992	16833.	13107.	3727.	12.1	2.14	0.0616
259.96	0.3991	16836.	13104.	3732.	12.1	2.14	0.0619

M3065.032



RHEOLOGY DATA FOR FILE
M3065.033

INITIAL HEIGHT OF BED 194.7 MM
MASS OF PROPELLANT 0.8762 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTAT = 0.04, PRINTING EVERY STEP

0.00	0.4329	213.	262.	-49.	0.0	4.12	0.0000
0.04	0.4329	213.	272.	-59.	0.0	4.12	0.0001
0.08	0.4328	213.	269.	-56.	0.0	4.06	0.0002
0.12	0.4325	577.	495.	82.	0.1	2.33	0.0007
0.16	0.4281	2544.	1993.	552.	1.6	2.63	0.0085
0.20	0.4212	5717.	4506.	1211.	3.9	2.78	0.0202
0.24	0.4134	7805.	6391.	1414.	6.5	2.80	0.0333
0.28	0.4055	10376.	8076.	2300.	9.0	2.95	0.0461
0.32	0.3987	14546.	11205.	3341.	11.1	3.11	0.0569
0.36	0.3922	17759.	13689.	4070.	13.0	3.25	0.0669
0.40	0.3870	21513.	16263.	5250.	14.6	3.43	0.0749
0.44	0.3824	22661.	17608.	5053.	15.9	3.45	0.0818
0.48	0.3783	25695.	19334.	6361.	17.1	3.65	0.0878
0.52	0.3752	27056.	20537.	6519.	18.0	3.71	0.0924
0.56	0.3724	29290.	21657.	7633.	18.8	3.85	0.0964
0.60	0.3709	30536.	22434.	8101.	19.2	3.93	0.0986
0.64	0.3695	31204.	22872.	8332.	19.6	3.98	0.1006
0.68	0.3686	31542.	23142.	8401.	19.8	4.00	0.1018
0.72	0.3680	31760.	23319.	8440.	20.0	4.02	0.1027
0.76	0.3674	31947.	23440.	8507.	20.1	4.03	0.1035
0.80	0.3671	32061.	23503.	8558.	20.2	4.04	0.1039
0.84	0.3668	32139.	23544.	8595.	20.3	4.05	0.1045
0.88	0.3662	31887.	23519.	8368.	20.5	4.03	0.1053
0.92	0.3662	32149.	23599.	8550.	20.5	4.05	0.1052
0.96	0.3656	32270.	23637.	8633.	20.6	4.06	0.1060
1.00	0.3656	32288.	23652.	8636.	20.7	4.07	0.1061
1.04	0.3653	32307.	23662.	8645.	20.7	4.07	0.1065
1.08	0.3651	32332.	23668.	8663.	20.8	4.07	0.1069
1.12	0.3652	32350.	23678.	8672.	20.8	4.07	0.1067

PRINTING EVERY 10 STEPS

1.16	0.3647	32360.	23688.	8672.	20.9	4.07	0.1073
1.56	0.3636	32456.	23716.	8740.	21.2	4.07	0.1090
1.96	0.3629	32496.	23738.	8758.	21.4	4.08	0.1099
2.36	0.3624	32490.	23757.	8733.	21.5	4.09	0.1106
2.76	0.3618	32490.	23773.	8717.	21.7	4.09	0.1114
3.16	0.3615	32506.	23792.	8714.	21.8	4.10	0.1119
3.56	0.3611	32521.	23818.	8704.	21.9	4.10	0.1123

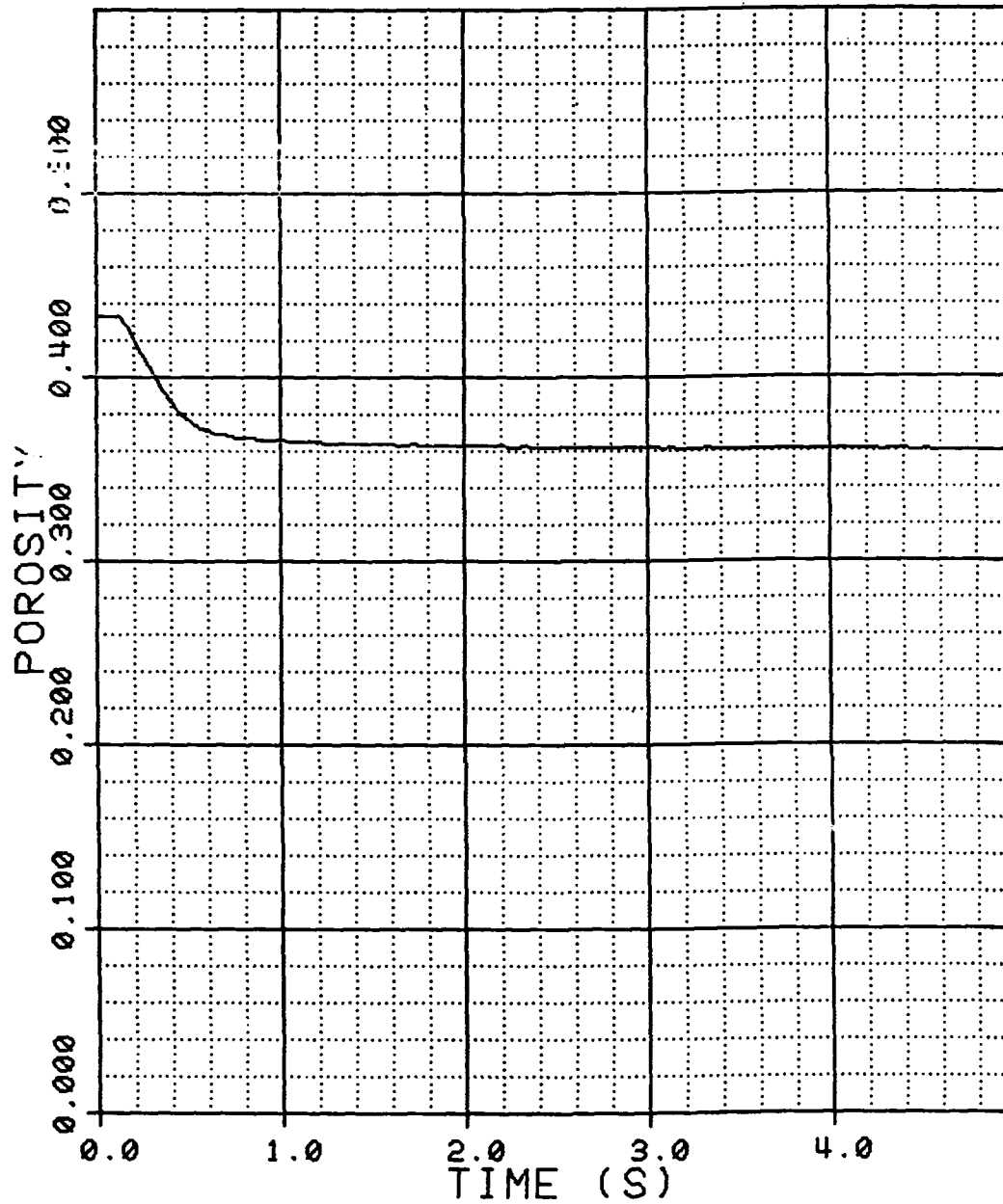
RHEOLOGY DATA FOR FILE
M3065.033

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.3608	32543.	23837.	8706.	22.0	4.11	0.1128
4.36	0.3605	32559.	23855.	8703.	22.0	4.11	0.1131
4.76	0.3603	32568.	23875.	8693.	22.1	4.09	0.1135
5.16	0.3601	32583.	23897.	8687.	22.1	4.10	0.1137
5.56	0.3598	32590.	23916.	8674.	22.2	4.10	0.1141
5.96	0.3596	32599.	23932.	8667.	22.3	4.11	0.1144
6.36	0.3595	32608.	23948.	8661.	22.3	4.10	0.1146
6.76	0.3593	32608.	23960.	8648.	22.4	4.11	0.1149
7.16	0.3587	32624.	23986.	8638.	22.5	4.10	0.1158
7.56	0.3589	32621.	23986.	8635.	22.5	4.10	0.1154
7.96	0.3588	32627.	24002.	8625.	22.5	4.11	0.1156
8.36	0.3586	32611.	24008.	8604.	22.6	4.10	0.1158
8.76	0.3585	32599.	24017.	8581.	22.6	4.10	0.1160
9.16	0.3583	32627.	24027.	8600.	22.6	4.10	0.1162
9.56	0.3583	32658.	24046.	8612.	22.6	4.10	0.1162
9.96	0.3581	32679.	24065.	8614.	22.7	4.11	0.1165

DELTA T = 1.00, PRINTING EVERY 10 STEPS

19.96	0.3563	32630.	24176.	8454.	23.2	4.11	0.1191
29.96	0.3548	32611.	24218.	8394.	23.6	4.12	0.1211
39.96	0.3538	32608.	24262.	8346.	23.8	4.11	0.1224
49.96	0.3529	32599.	24278.	8321.	24.1	4.11	0.1236
59.96	0.3523	32602.	24303.	8299.	24.2	4.11	0.1244
69.96	0.3512	32611.	24370.	8241.	24.5	4.12	0.1259
79.96	0.3512	32605.	24379.	8226.	24.5	4.12	0.1260
89.96	0.3501	32611.	24430.	8181.	24.8	4.11	0.1274
99.96	0.3495	32617.	24452.	8165.	25.0	4.12	0.1282
109.96	0.3491	32615.	24459.	8156.	25.1	4.11	0.1287
119.96	0.3486	32615.	24468.	8147.	25.2	4.12	0.1295
129.96	0.3482	32617.	24471.	8146.	25.3	4.12	0.1299
139.96	0.3479	32614.	24474.	8140.	25.4	4.11	0.1304
149.96	0.3474	32614.	24449.	8165.	25.5	4.11	0.1311
159.96	0.3471	32617.	24455.	8162.	25.6	4.11	0.1314
169.96	0.3468	32617.	24455.	8162.	25.7	4.12	0.1318
179.96	0.3464	32624.	24462.	8162.	25.8	4.12	0.1324
189.96	0.3461	32627.	24468.	8159.	25.8	4.12	0.1327
199.96	0.3458	32630.	24468.	8162.	25.9	4.12	0.1332
209.96	0.3455	32636.	24471.	8165.	26.0	4.12	0.1335
219.96	0.3453	32639.	24471.	8168.	26.0	4.11	0.1338
229.96	0.3449	32642.	24481.	8162.	26.2	4.13	0.1344
239.96	0.3446	32646.	24487.	8159.	26.2	4.11	0.1347
249.96	0.3445	32645.	24487.	8159.	26.3	4.13	0.1349
259.96	0.3441	32649.	24493.	8156.	26.3	4.12	0.1353

M3065.033



RHEOLOGY DATA FOR FILE
M3065.034

INITIAL HEIGHT OF BED 195.6 MM
MASS OF PROPELLANT 0.8755 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTAT = 0.04. PRINTING EVERY STEP

0.00	0.4358	222.	212.	10.	0.0	4.11	0.0000
0.04	0.4358	225.	224.	1.	0.0	4.12	0.0001
0.08	0.4357	228.	221.	7.	0.0	4.06	0.0002
0.12	0.4352	766.	516.	249.	0.2	2.33	0.0012
0.16	0.4299	2944.	2103.	841.	2.0	2.63	0.0104
0.20	0.4229	6627.	4867.	1760.	4.4	2.82	0.0224
0.24	0.4159	11142.	8319.	2823.	6.7	2.99	0.0342
0.28	0.4093	15080.	11311.	3777.	8.8	3.14	0.0449
0.32	0.4034	18158.	13536.	4622.	10.6	3.27	0.0543
0.36	0.3980	20964.	15554.	5410.	12.3	3.39	0.0628
0.40	0.3939	22804.	16895.	5988.	13.5	3.47	0.0692
0.44	0.3892	23228.	17346.	5882.	14.9	3.47	0.0763
0.48	0.3853	25199.	18797.	6402.	16.1	3.60	0.0823
0.52	0.3820	25901.	19348.	6552.	17.0	3.63	0.0871
0.56	0.3788	28303.	20592.	7711.	18.0	3.78	0.0918
0.60	0.3765	29555.	21468.	8086.	18.6	3.85	0.0952
0.64	0.3747	30450.	22080.	8370.	19.1	3.91	0.0978
0.68	0.3734	31037.	22480.	8557.	19.5	3.95	0.0997
0.72	0.3725	31400.	22734.	8666.	19.7	3.97	0.1009
0.76	0.3715	31636.	22910.	8719.	20.0	3.98	0.1024
0.80	0.3708	31814.	23071.	8743.	20.2	4.00	0.1034
0.84	0.3700	32041.	23194.	8847.	20.4	4.02	0.1044
0.88	0.3695	32190.	23273.	8916.	20.6	4.03	0.1052
0.92	0.3694	32196.	23289.	8986.	20.6	4.03	0.1053
0.96	0.3686	32305.	23337.	8968.	20.8	4.05	0.1065
1.00	0.3685	32357.	23375.	8983.	20.9	4.06	0.1067
1.04	0.3680	32385.	23394.	8991.	21.0	4.06	0.1073
1.08	0.3677	32429.	23417.	9012.	21.1	4.06	0.1078
1.12	0.3677	32457.	23429.	9028.	21.1	4.06	0.1078

PRINTING EVERY 10 STEPS

1.16	0.3672	32491.	23442.	9049.	21.2	4.06	0.1085
1.56	0.3653	32584.	23527.	9057.	21.7	4.07	0.1111
1.96	0.3642	32631.	23575.	9056.	22.0	4.06	0.1127
2.36	0.3631	32656.	23600.	9056.	22.3	4.08	0.1142
2.76	0.3626	32662.	23635.	9027.	22.5	4.08	0.1149
3.16	0.3619	32653.	23657.	8996.	22.7	4.08	0.1159
3.56	0.3614	32650.	23686.	8964.	22.8	4.08	0.1166

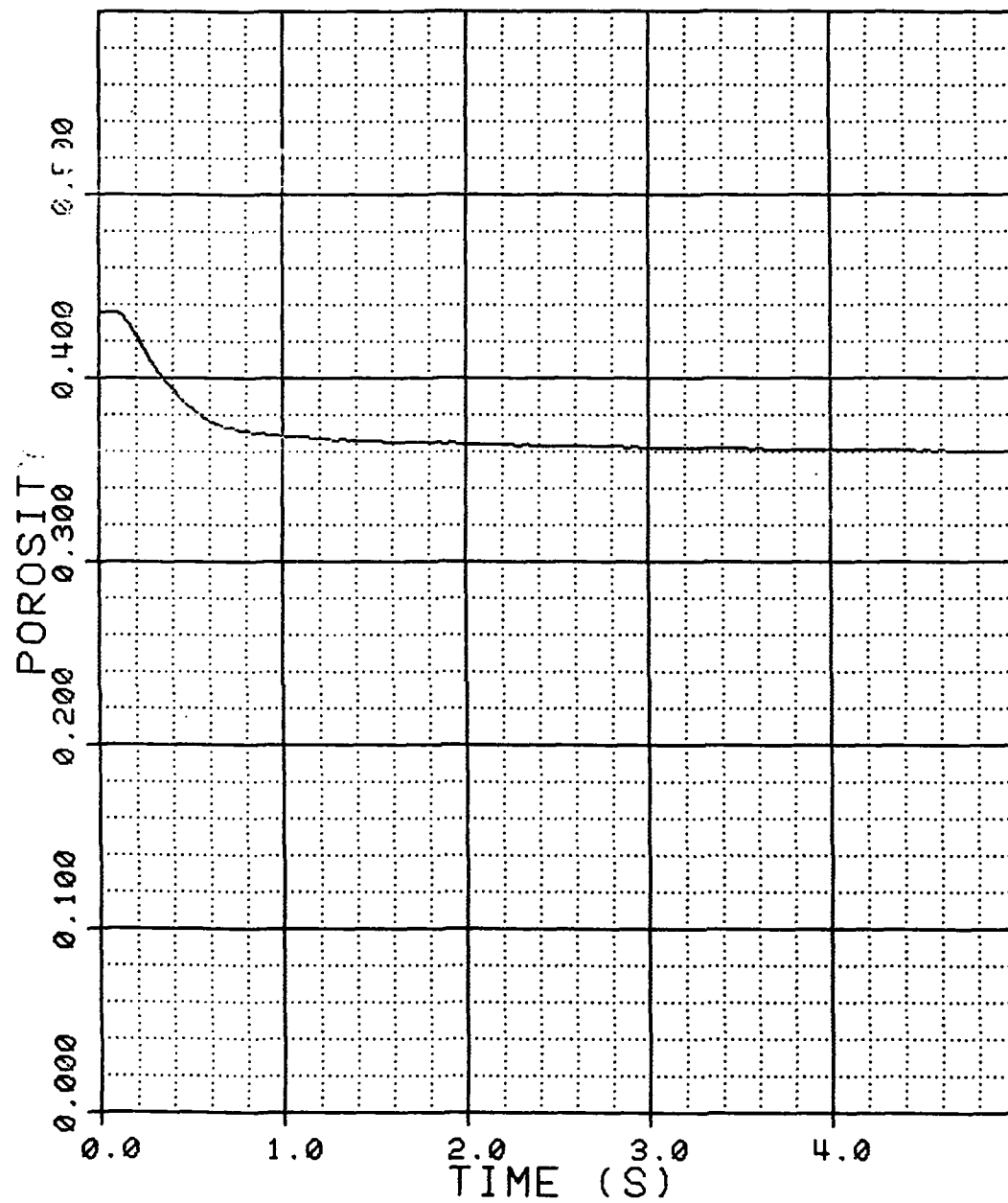
RHEOLOGY DATA FOR FILE
M3065.034

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.3612	32650.	23700.	8942.	22.9	4.08	0.1169
4.36	0.3606	32656.	23737.	8919.	23.0	4.08	0.1177
4.76	0.3603	32656.	23743.	8913.	23.1	4.10	0.1181
5.16	0.3600	32662.	23768.	8894.	23.2	4.09	0.1185
5.56	0.3596	32668.	23788.	8881.	23.3	4.09	0.1190
5.96	0.3593	32665.	23810.	8855.	23.4	4.09	0.1194
6.36	0.3590	32672.	23825.	8846.	23.4	4.09	0.1199
6.76	0.3587	32681.	23845.	8836.	23.5	4.09	0.1203
7.16	0.3583	32681.	23864.	8817.	23.6	4.09	0.1208
7.56	0.3582	32687.	23876.	8811.	23.7	4.09	0.1209
7.96	0.3579	32690.	23895.	8795.	23.7	4.09	0.1214
8.36	0.3578	32693.	23908.	8785.	23.8	4.10	0.1215
8.76	0.3576	32696.	23927.	8769.	23.8	4.09	0.1218
9.16	0.3574	32699.	23943.	8757.	23.9	4.09	0.1221
9.56	0.3571	32696.	23959.	8737.	23.9	4.08	0.1224
9.96	0.3570	32699.	23975.	8725.	24.0	4.09	0.1226

DELTAT = 1.00, PRINTING EVERY 10 STEPS

19.96	0.3545	32678.	24187.	8490.	24.7	4.09	0.1261
29.96	0.3525	32718.	24318.	8400.	25.2	4.09	0.1288
39.96	0.3512	32715.	24397.	8318.	25.5	4.09	0.1305
49.96	0.3503	32715.	24416.	8299.	25.8	4.10	0.1317
59.96	0.3492	32709.	24473.	8236.	26.0	4.10	0.1331
69.96	0.3486	32699.	24501.	8198.	26.2	4.09	0.1339
79.96	0.3481	32699.	24524.	8176.	26.3	4.10	0.1347
89.96	0.3471	32699.	24543.	8156.	26.6	4.10	0.1359
99.96	0.3465	32687.	24565.	8122.	26.7	4.10	0.1367
109.96	0.3460	32696.	24587.	8109.	26.9	4.09	0.1374
119.96	0.3454	32690.	24600.	8090.	27.0	4.09	0.1382
129.96	0.3449	32693.	24609.	8084.	27.1	4.09	0.1383
139.96	0.3445	32697.	24622.	8075.	27.3	4.09	0.1394
149.96	0.3440	32693.	24631.	8062.	27.4	4.10	0.1400
159.96	0.3436	32680.	24638.	8042.	27.5	4.09	0.1406
169.96	0.3434	32699.	24650.	8049.	27.5	4.08	0.1408
179.96	0.3428	32693.	24660.	8033.	27.7	4.09	0.1416
189.96	0.3425	32696.	24670.	8027.	27.8	4.11	0.1420
199.96	0.3421	32699.	24670.	8030.	27.9	4.10	0.1425
209.96	0.3418	32693.	24682.	8011.	27.9	4.09	0.1429
219.96	0.3415	32690.	24685.	8004.	28.0	4.10	0.1432
229.96	0.3412	32693.	24698.	7995.	28.1	4.10	0.1437
239.96	0.3407	32667.	24714.	7952.	28.2	4.12	0.1443
249.96	0.3406	32690.	24707.	7983.	28.3	4.09	0.1445
259.96	0.3401	32690.	24711.	7979.	28.4	4.10	0.1451

M3065.034



RHEOLOGY DATA FOR FILE
M3065.035

INITIAL HEIGHT OF BED 195.9 MM
MASS OF PROPELLANT 0.8767 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTAT = 0.04, PRINTING EVERY STEP

0.00	0.4361	165.	217.	-52.	0.0	6.05	0.0300
0.04	0.4363	162.	210.	-49.	-0.1	6.05	-0.0304
0.08	0.4361	162.	210.	-49.	0.0	6.04	0.0300
0.12	0.4356	606.	430.	176.	0.2	3.62	0.0008
0.16	0.4289	3192.	2127.	1065.	2.5	3.95	0.0125
0.20	0.4188	7349.	4872.	2478.	5.8	4.16	0.0296
0.24	0.4090	13204.	8997.	4206.	9.0	4.38	0.0457
0.28	0.3993	18896.	12836.	6060.	12.0	4.58	0.0611
0.32	0.3910	24075.	16494.	7581.	14.5	4.76	0.0740
0.36	0.3829	26050.	18353.	7697.	16.9	4.81	0.0861
0.40	0.3754	30535.	20714.	9821.	19.0	5.05	0.0970
0.44	0.3693	33275.	22830.	10445.	20.7	5.14	0.1059
0.48	0.3632	35471.	24311.	11160.	22.4	5.21	0.1144
0.52	0.3580	37659.	25463.	12196.	23.8	5.35	0.1215
0.56	0.3536	40608.	27199.	13409.	25.0	5.52	0.1275
0.60	0.3499	43035.	28573.	14462.	26.0	5.65	0.1325
0.64	0.3476	44342.	29397.	14945.	26.6	5.72	0.1356
0.68	0.3452	45315.	30000.	15315.	27.2	5.78	0.1387
0.72	0.3438	46138.	30502.	15636.	27.5	5.84	0.1406
0.76	0.3425	46613.	30765.	15849.	27.9	5.87	0.1423
0.80	0.3416	46915.	30933.	15982.	28.1	5.90	0.1435
0.84	0.3410	47166.	31101.	16066.	28.3	5.92	0.1442
0.88	0.3402	47328.	31215.	16113.	28.5	5.93	0.1453
0.92	0.3398	47437.	31298.	16139.	28.6	5.94	0.1458
0.96	0.3392	47524.	31348.	16176.	28.7	5.94	0.1466
1.00	0.3388	47601.	31399.	16202.	28.8	5.96	0.1471
1.04	0.3387	47648.	31434.	16214.	28.8	5.96	0.1472
1.08	0.3382	47701.	31469.	16232.	29.0	5.96	0.1479
1.12	0.3379	47757.	31523.	16234.	29.0	5.96	0.1483

PRINTING EVERY 10 STEPS

1.16	0.3376	47782.	31551.	16230.	29.1	5.96	0.1486
1.56	0.3354	48015.	31796.	16219.	29.7	5.99	0.1515
1.96	0.3340	48102.	31910.	16191.	30.0	6.00	0.1532
2.36	0.3330	48151.	32000.	16143.	30.3	6.00	0.1545
2.76	0.3321	48192.	32117.	16075.	30.5	6.01	0.1556
3.16	0.3314	48223.	32164.	16059.	30.7	6.02	0.1565
3.56	0.3309	48139.	31986.	16153.	30.8	6.01	0.1572

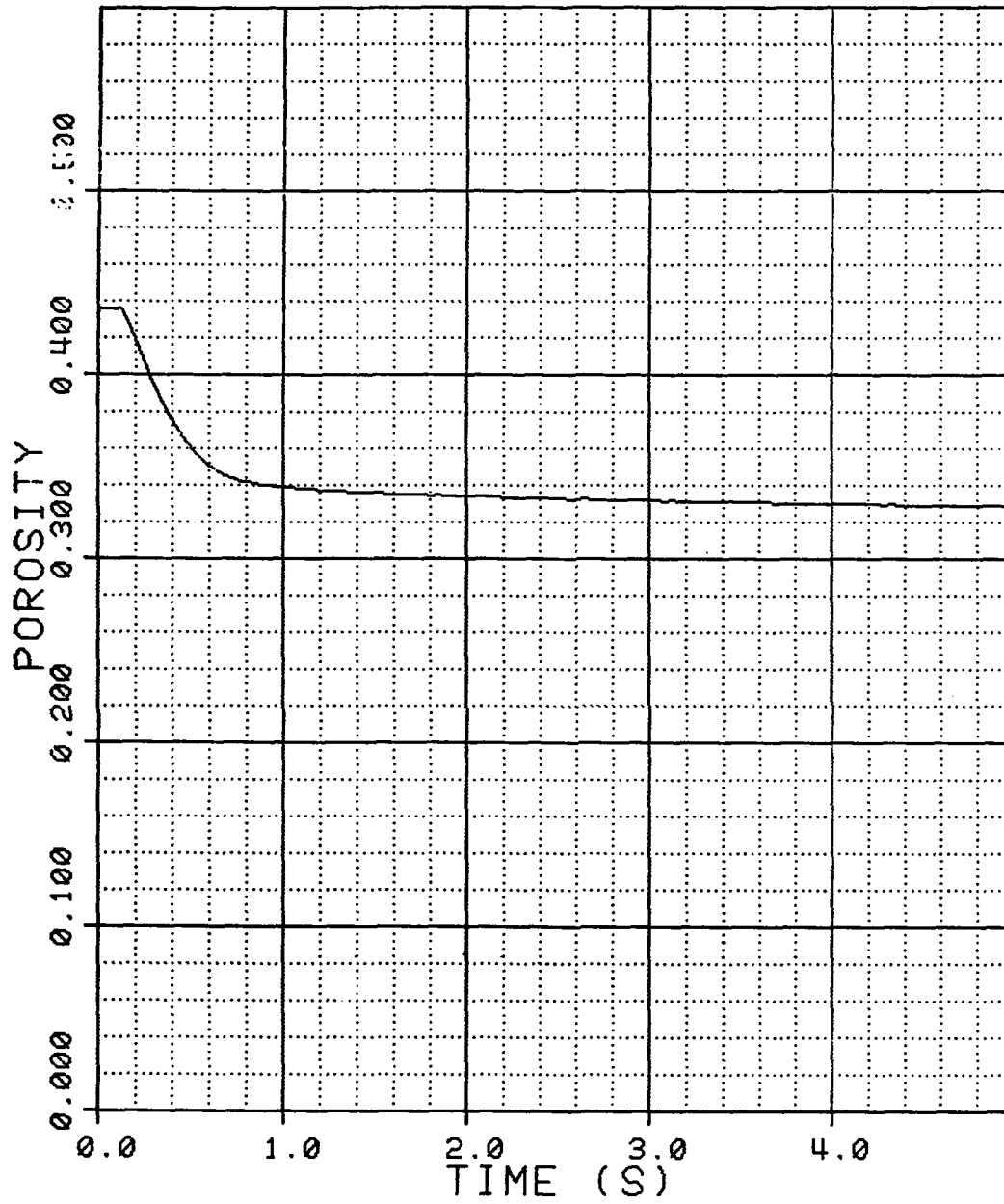
RHEOLOGY DATA FOR FILE
M3065.035

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.3300	48282.	32101.	16181.	31.0	6.02	0.1583
4.36	0.3293	48307.	32177.	16130.	31.2	6.02	0.1591
4.76	0.3288	48331.	32278.	16053.	31.3	6.03	0.1598
5.16	0.3284	48356.	32354.	16002.	31.4	6.04	0.1603
5.56	0.3281	48400.	32415.	15985.	31.5	6.04	0.1607
5.96	0.3277	48403.	32472.	15931.	31.6	6.04	0.1612
6.36	0.3272	48403.	32513.	15890.	31.7	6.04	0.1617
6.76	0.3270	48403.	32545.	15858.	31.7	6.03	0.1620
7.16	0.3265	48409.	32589.	15820.	31.9	6.04	0.1626
7.56	0.3263	48412.	32627.	15785.	31.9	6.04	0.1629
7.96	0.3262	48416.	32637.	15779.	32.0	6.04	0.1631
8.36	0.3257	48412.	32574.	15839.	32.1	6.04	0.1636
8.76	0.3252	48412.	32592.	15820.	32.2	6.05	0.1643
9.16	0.3249	48425.	32672.	15753.	32.3	6.05	0.1646
9.56	0.3245	48431.	32716.	15715.	32.3	6.04	0.1651
9.96	0.3244	48431.	32744.	15687.	32.4	6.06	0.1652

DELTAT = 1.00, PRINTING EVERY 10 STEPS

19.96	0.3204	48437.	33072.	15366.	33.3	6.05	0.1702
29.96	0.3179	48425.	33160.	15265.	33.9	6.05	0.1732
39.96	0.3161	48416.	33268.	15148.	34.4	6.05	0.1754
49.96	0.3145	48403.	33351.	15053.	34.7	6.05	0.1773
59.96	0.3133	48397.	33407.	14990.	35.0	6.07	0.1788
69.96	0.3121	48394.	33452.	14942.	35.3	6.08	0.1801
79.96	0.3113	48388.	33493.	14894.	35.5	6.07	0.1812
89.96	0.3108	48381.	33529.	14852.	35.6	6.07	0.1818
99.96	0.3098	48385.	33547.	14837.	35.8	6.07	0.1830
109.96	0.3091	48378.	33563.	14815.	36.0	6.08	0.1838
119.96	0.3083	48375.	33579.	14797.	36.2	6.09	0.1847
129.96	0.3074	48375.	33586.	14789.	36.4	6.08	0.1858
139.96	0.3066	48369.	33598.	14771.	36.6	6.07	0.1867
149.96	0.3062	48369.	33598.	14771.	36.7	6.07	0.1872
159.96	0.3056	48363.	33604.	14759.	36.8	6.06	0.1878
169.96	0.3050	48360.	33604.	14755.	36.9	6.07	0.1885
179.96	0.3044	48357.	33608.	14749.	37.1	6.08	0.1893
189.96	0.3041	48347.	33608.	14739.	37.1	6.06	0.1896
199.96	0.3036	48341.	33604.	14737.	37.3	6.08	0.1902
209.96	0.3032	48341.	33608.	14733.	37.4	6.06	0.1906
219.96	0.3027	48338.	33604.	14733.	37.5	6.06	0.1912
229.96	0.3021	48335.	33604.	14730.	37.6	6.06	0.1920
239.96	0.3016	48335.	33598.	14737.	37.7	6.07	0.1926
249.96	0.3010	48338.	33601.	14737.	37.9	6.08	0.1932
259.96	0.3006	48335.	33595.	14740.	37.9	6.06	0.1936

M3065.035



RHEOLOGY DATA FOR FILE
M3065.036

INITIAL HEIGHT OF BED 194.5 MM
MASS OF PROPELLANT 0.8751 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTAT = 0.04. PRINTING EVERY STEP

0.00	0.4331	44.	158.	-114.	0.0	6.17	0.0300
0.04	0.4331	41.	158.	-117.	0.0	6.17	0.0300
0.08	0.4331	47.	155.	-108.	-0.0	6.15	-0.0000
0.12	0.4333	37.	152.	-114.	-0.1	3.71	-0.0003
0.16	0.4331	106.	186.	-80.	-0.0	3.94	-0.0000
0.20	0.4324	380.	342.	38.	0.2	3.99	0.0012
0.24	0.4316	778.	555.	223.	0.5	4.00	0.0027
0.28	0.4303	1443.	917.	526.	1.0	4.02	0.0049
0.32	0.4280	2698.	1723.	976.	1.7	4.06	0.0088
0.36	0.4233	5032.	3309.	1722.	3.3	4.16	0.0170
0.40	0.4170	8969.	6013.	2956.	5.4	4.32	0.0277
0.44	0.4090	13860.	9437.	4423.	7.9	4.51	0.0408
0.48	0.4004	18754.	12947.	5808.	10.6	4.68	0.0545
0.52	0.3925	24528.	16475.	8053.	13.0	4.91	0.0668
0.56	0.3842	25465.	18759.	6706.	15.5	4.88	0.0794
0.60	0.3768	29797.	20447.	9350.	17.6	5.10	0.0904
0.64	0.3696	31689.	21484.	10205.	19.6	5.16	0.1007
0.68	0.3632	35670.	23369.	12301.	21.3	5.37	0.1097
0.72	0.3578	36595.	24352.	12243.	22.8	5.38	0.1172
0.76	0.3521	38010.	24901.	13109.	24.3	5.51	0.1250
0.80	0.3473	41127.	25983.	15143.	25.6	5.65	0.1314
0.84	0.3437	42826.	27170.	15656.	26.5	5.71	0.1362
0.88	0.3406	44302.	27757.	16545.	27.3	5.81	0.1403
0.92	0.3388	45890.	28502.	17387.	27.7	5.92	0.1426
0.96	0.3371	46794.	29099.	17695.	28.2	5.97	0.1448
1.00	0.3361	46884.	29242.	17642.	28.4	5.97	0.1460
1.04	0.3351	47275.	29581.	17694.	28.7	6.01	0.1473
1.08	0.3345	47623.	29816.	17807.	28.8	6.03	0.1482
1.12	0.3332	42945.	29171.	13773.	29.1	5.62	0.1498

PRINTING EVERY 10 STEPS

1.16	0.3310	46661.	29816.	16845.	29.7	5.99	0.1526
1.56	0.3274	48195.	30460.	17735.	30.6	6.07	0.1572
1.96	0.3259	48363.	30612.	17751.	30.9	6.09	0.1590
2.36	0.3251	48472.	30667.	17805.	31.1	6.11	0.1600
2.76	0.3244	48571.	30742.	17829.	31.3	6.11	0.1609
3.16	0.3238	48605.	30806.	17800.	31.4	6.12	0.1616
3.56	0.3232	48580.	30793.	17787.	31.6	6.13	0.1623

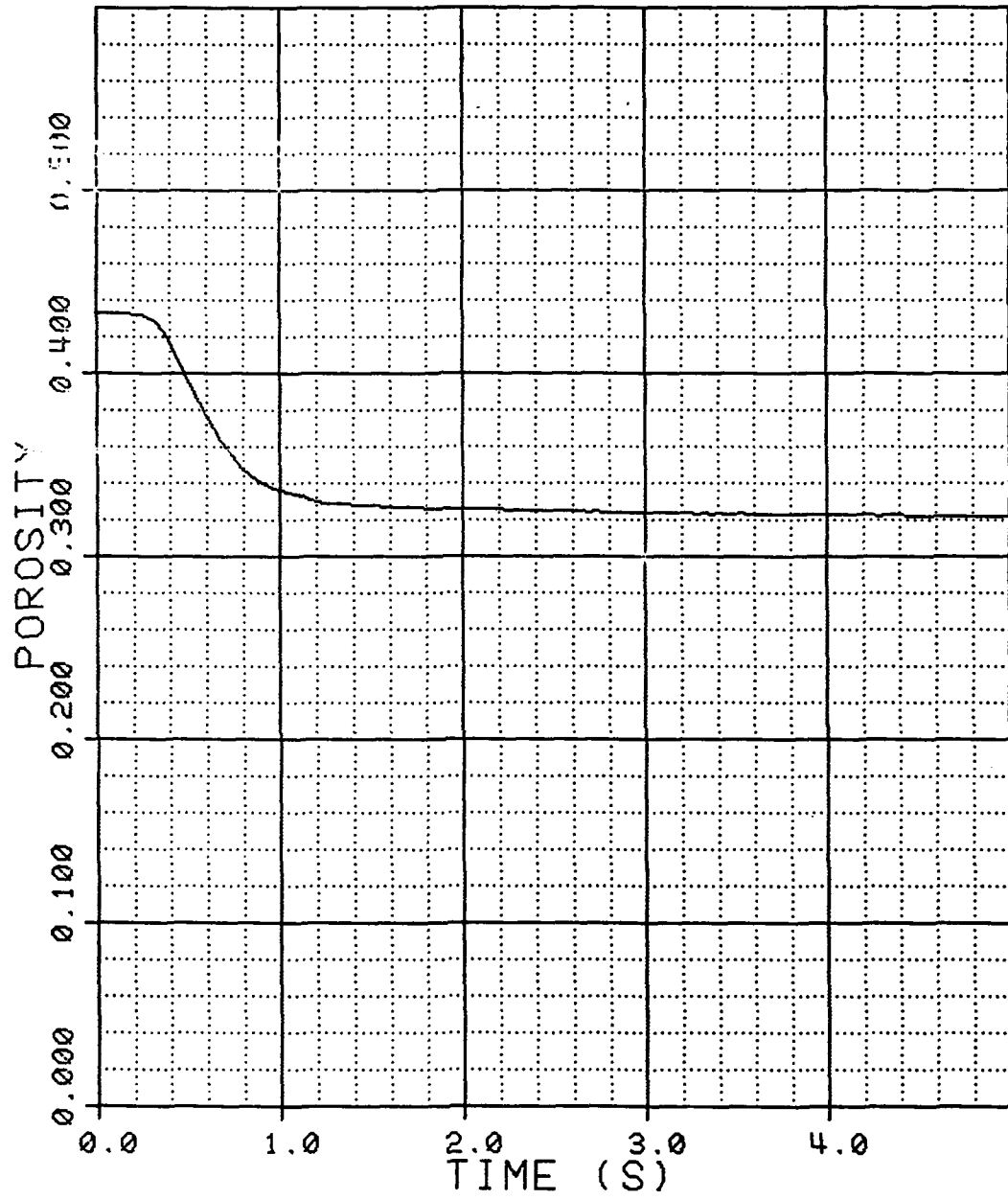
RHEOLOGY DATA FOR FILE
M3065.036

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-
3.96	0.3229	48590.	30832.	17758.	31.7	6.14	0.1627
4.36	0.3225	48630.	30876.	17754.	31.7	6.14	0.1632
4.76	0.3222	48667.	30911.	17757.	31.8	6.15	0.1636
5.16	0.3218	48689.	30942.	17747.	31.9	6.15	0.1541
5.56	0.3217	48723.	30971.	17752.	32.0	6.15	0.1643
5.96	0.3213	48745.	30996.	17749.	32.0	6.17	0.1647
6.36	0.3210	48757.	31002.	17755.	32.1	6.16	0.1651
6.76	0.3208	48776.	31025.	17751.	32.1	6.17	0.1653
7.16	0.3207	48792.	31044.	17747.	32.2	6.16	0.1654
7.56	0.3205	48792.	31066.	17725.	32.2	6.16	0.1656
7.96	0.3203	48785.	31070.	17716.	32.3	6.17	0.1660
8.36	0.3202	48779.	31085.	17694.	32.3	6.15	0.1661
8.76	0.3200	48736.	31082.	17654.	32.4	6.16	0.1663
9.16	0.3198	48726.	31034.	17692.	32.4	6.16	0.1666
9.56	0.3197	48723.	31034.	17689.	32.4	6.16	0.1667
9.96	0.3194	48717.	31063.	17654.	32.5	6.16	0.1670

DELTAT = 1.00, PRINTING EVERY 10 STEPS

19.96	0.3174	48714.	31142.	17572.	33.0	6.17	0.1694
29.96	0.3159	48711.	31149.	17562.	33.3	6.15	0.1713
39.96	0.3150	48704.	31167.	17537.	33.5	6.15	0.1724
49.96	0.3134	48711.	31184.	17527.	33.9	6.15	0.1744
59.96	0.3132	48704.	31180.	17524.	33.9	6.17	0.1745
69.96	0.3127	48701.	31187.	17515.	34.1	6.15	0.1752
79.96	0.3122	48708.	31187.	17521.	34.2	6.14	0.1757
89.96	0.3117	48701.	31187.	17515.	34.3	6.16	0.1763
99.96	0.3113	48704.	31202.	17502.	34.4	6.16	0.1769
109.96	0.3107	48711.	31206.	17505.	34.5	6.14	0.1775
119.96	0.3104	48714.	31218.	17495.	34.6	6.15	0.1779
129.96	0.3101	48714.	31221.	17493.	34.7	6.16	0.1783
139.96	0.3098	48714.	31231.	17482.	34.8	6.16	0.1787
149.96	0.3095	48711.	31234.	17477.	34.8	6.16	0.1790
159.96	0.3091	48711.	31247.	17464.	34.9	6.14	0.1795
169.96	0.3089	48711.	31253.	17458.	35.0	6.12	0.1797
179.96	0.3086	48708.	31256.	17451.	35.0	6.11	0.1800
189.96	0.3084	48708.	31259.	17448.	35.1	6.12	0.1803
199.96	0.3081	48717.	31266.	17451.	35.1	6.17	0.1807
209.96	0.3078	48714.	31275.	17439.	35.2	6.14	0.1810
219.96	0.3077	48714.	31278.	17436.	35.2	6.16	0.1811
229.96	0.3074	48717.	31292.	17425.	35.3	6.17	0.1814
239.96	0.3072	48720.	31294.	17426.	35.3	6.17	0.1817
249.96	0.3071	48720.	31304.	17416.	35.4	6.14	0.1819
259.96	0.3068	48729.	31307.	17422.	35.4	6.16	0.1822

M3065.036



RHEOLOGY DATA FOR FILE
M3065.037

INITIAL HEIGHT OF BED 195.3 MM
MASS OF PROPELLANT 0.8760 KG

TIME	POROSITY	AVERAGE UPPER FORCE	AVERAGE LOWER FORCE	RESISTIVE FORCE	AVERAGE DISTANCE MOVED	OIL PRESSURE	STRAIN
S	-	N	N	N	MM	MPA	-

DELTAT = 0.04. PRINTING EVERY STEP

0.00	0.4348	4.	67.	-63.	0.0	2.12	0.0000
0.04	0.4344	10.	70.	-60.	0.1	2.12	0.0007
0.08	0.4343	7.	66.	-59.	0.2	2.07	0.0009
0.12	0.4345	0.	67.	-66.	0.1	1.04	0.0006
0.16	0.4335	50.	67.	-17.	0.5	1.19	0.0023
0.20	0.4269	209.	254.	-46.	2.7	1.20	0.0139
0.24	0.4261	333.	333.	-0.	3.0	1.21	0.0153
0.28	0.4258	624.	460.	164.	3.1	1.23	0.0157
0.32	0.4247	1144.	755.	389.	3.4	1.24	0.0177
0.36	0.4227	1961.	1333.	628.	4.1	1.28	0.0209
0.40	0.4202	3111.	2219.	892.	4.9	1.34	0.0252
0.44	0.4171	4422.	3228.	1194.	5.9	1.39	0.0305
0.48	0.4134	6159.	4513.	1646.	7.1	1.48	0.0365
0.52	0.4101	8045.	5823.	2221.	8.2	1.57	0.0419
0.56	0.4067	9819.	7064.	2755.	9.3	1.67	0.0475
0.60	0.4037	11018.	7997.	3021.	10.2	1.73	0.0521
0.64	0.4015	12531.	9003.	3529.	10.9	1.82	0.0558
0.68	0.3992	13296.	9520.	3776.	11.6	1.86	0.0593
0.72	0.3978	14274.	10142.	4133.	12.0	1.93	0.0616
0.76	0.3962	14924.	10602.	4322.	12.5	1.97	0.0639
0.80	0.3950	15461.	10967.	4495.	12.9	2.02	0.0659
0.84	0.3945	15818.	11224.	4595.	13.0	2.04	0.0666
0.88	0.3938	16045.	11389.	4656.	13.2	2.05	0.0676
0.92	0.3935	16095.	11484.	4611.	13.3	2.05	0.0681
0.96	0.3930	16222.	11560.	4662.	13.5	2.07	0.0689
1.00	0.3926	16353.	11630.	4723.	13.6	2.08	0.0695
1.04	0.3925	16415.	11674.	4740.	13.6	2.08	0.0697
1.08	0.3921	16468.	11716.	4752.	13.7	2.08	0.0702
1.12	0.3921	16508.	11744.	4764.	13.7	2.09	0.0703

PRINTING EVERY 10 STEPS

1.16	0.3918	16545.	11773.	4773.	13.8	2.09	0.0707
1.56	0.3907	16688.	11893.	4795.	14.1	2.10	0.0724
1.96	0.3901	16710.	11935.	4776.	14.3	2.10	0.0733
2.36	0.3897	16788.	11992.	4796.	14.4	2.11	0.0739
2.76	0.3893	16813.	12023.	4789.	14.6	2.10	0.0746
3.16	0.3892	16835.	12052.	4782.	14.6	2.10	0.0748
3.56	0.3888	16841.	12074.	4767.	14.7	2.11	0.0754

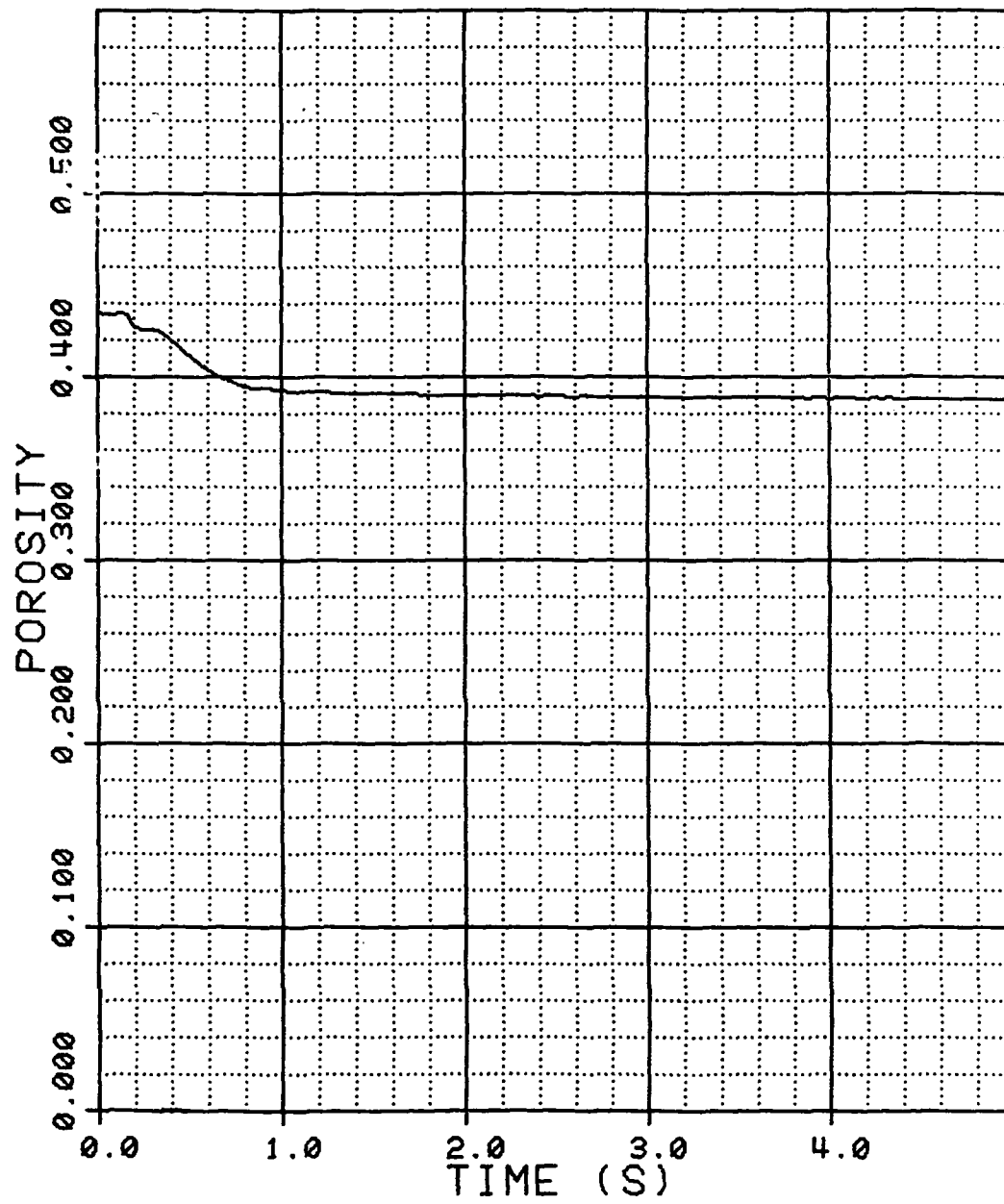
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S	-	N	N	N	MM	MPA	-
3.96	0.3886	16850.	12093.	4757.	14.8	2.11	0.0757
4.36	0.3883	16835.	12106.	4729.	14.9	2.11	0.0761
4.76	0.3882	16816.	12112.	4704.	14.9	2.11	0.0762
5.16	0.3881	16822.	12120.	4694.	14.9	2.11	0.0764
5.56	0.3879	16822.	12134.	4688.	15.0	2.11	0.0767
5.96	0.3878	16828.	12144.	4685.	15.0	2.11	0.0769
6.36	0.3876	16837.	12147.	4690.	15.1	2.11	0.0771
6.76	0.3875	16841.	12141.	4700.	15.1	2.11	0.0773
7.16	0.3874	16844.	12150.	4694.	15.1	2.11	0.0774
7.56	0.3872	16853.	12163.	4690.	15.2	2.12	0.0777
7.96	0.3871	16853.	12159.	4694.	15.2	2.12	0.0778
8.36	0.3871	16850.	12182.	4668.	15.2	2.12	0.0779
8.76	0.3870	16847.	12192.	4655.	15.2	2.12	0.0780
9.16	0.3868	16850.	12201.	4649.	15.3	2.12	0.0783
9.56	0.3867	16856.	12204.	4652.	15.3	2.12	0.0785
9.96	0.3867	16863.	12217.	4646.	15.3	2.12	0.0784

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19.96	0.3854	16878.	12318.	4560.	15.7	2.12	0.0804
29.96	0.3845	16866.	12372.	4493.	16.0	2.12	0.0817
39.96	0.3840	16869.	12410.	4458.	16.1	2.13	0.0826
49.96	0.3834	16878.	12439.	4439.	16.3	2.12	0.0834
59.96	0.3829	16860.	12448.	4411.	16.4	2.12	0.0841
69.96	0.3825	16859.	12471.	4389.	16.5	2.12	0.0847
79.96	0.3822	16872.	12490.	4382.	16.7	2.13	0.0853
89.96	0.3818	16872.	12502.	4370.	16.8	2.13	0.0858
99.96	0.3815	16894.	12518.	4375.	16.8	2.12	0.0862
109.96	0.3812	16884.	12525.	4360.	16.9	2.12	0.0866
119.96	0.3809	16872.	12534.	4338.	17.0	2.12	0.0872
129.96	0.3809	16872.	12534.	4338.	17.0	2.13	0.0871
139.96	0.3806	16875.	12540.	4335.	17.1	2.11	0.0875
149.96	0.3802	16884.	12547.	4338.	17.2	2.12	0.0882
159.96	0.3800	16875.	12556.	4319.	17.3	2.11	0.0884
169.96	0.3800	16878.	12556.	4322.	17.3	2.11	0.0885
179.96	0.3797	16875.	12566.	4309.	17.4	2.11	0.0888
189.96	0.3795	16888.	12572.	4315.	17.4	2.12	0.0891
199.96	0.3793	16891.	12576.	4315.	17.5	2.12	0.0895
209.96	0.3793	16903.	12585.	4318.	17.5	2.12	0.0895
219.96	0.3791	16887.	12588.	4299.	17.5	2.12	0.0897
229.96	0.3789	16906.	12591.	4315.	17.6	2.12	0.0900
239.96	0.3789	16894.	12595.	4299.	17.6	2.12	0.0901
249.96	0.3785	16891.	12591.	4299.	17.7	2.12	0.0906
259.96	0.3784	16903.	12601.	4302.	17.7	2.12	0.0908

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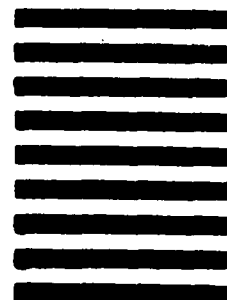


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